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University of Minnesota - Pharmacy - 1919-1920.

The Bulletin of the University of Minnesota

*The College of Pharmacy
Announcement for the Year
1919-1920*

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1919							1920						
JULY							JANUARY						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	..	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
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AUGUST							FEBRUARY						
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31	..	..	..	..	..	..	..	..	..	..	..	..	..
SEPTEMBER							MARCH						
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OCTOBER							APRIL						
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12	13	14	15	16	17	18	11	12	13	14	15	16	17
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16	17	18	19	20	21	22	16	17	18	19	20	21	22
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DECEMBER							JUNE						
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SEPTEMBER							OCTOBER						
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9	10	11	12	13	14	15	9	10	11	12	13	14	15
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DECEMBER							JANUARY						
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UNIVERSITY CALENDAR

1919-1920

1919			
September	24-30	Week	Examinations for removal of conditions and entrance examinations
September	29-30		Registration days
October	1	Wednesday	Fall quarter begins
October	16	Thursday	Senate meeting, 4:00 p.m.
November	27	Thursday	Thanksgiving Day; a holiday
December	18	Thursday	Senate meeting, 4:00 p.m.
December	23	Tuesday	Christmas vacation begins, 9:00 p.m.
1920			
January	2	Friday	Christmas vacation ends, 8:30 a.m.
January	2	Friday	Winter quarter begins
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Senate meeting, 4:00 p.m.
March	25	Thursday	Winter quarter ends
April	1	Thursday	Spring quarter begins
April	2	Friday	Good Friday; a holiday
May	20	Thursday	Senate meeting, 4:00 p.m.
June	13	Sunday	Baccalaureate service
June	16	Wednesday	Spring quarter closes
June	17	Thursday	Forty-eighth Annual Commencement
June	18-19		Registration days for summer quarter
June	21	Monday	Summer quarter begins
September	3	Friday	Summer quarter ends.

THE COLLEGE OF PHARMACY

FACULTY

- MARION LEROY BURTON, Ph.D., D.D., LL.D., President
CYRUS NORTHPROP, LL.D., President, Emeritus
FREDERICK J. WULLING, Phm.G., Phm.D., LL.M., Dean, Professor of Pharmacology, and Director of the University Medicinal Plant Gardens
GUSTAV BACHMAN, Phm.D., M.Phm., Associate Professor of Pharmacy
RICHARD OLDING BEARD, M.D., Associate Professor of Physiology
HENRY C. BERTELSEN, Lieutenant, United States Army, Assistant Professor of Military Science and Tactics
EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology
FRANK H. BURTON, Colonel, United States Army, Professor of Military Science and Tactics, Commandant
FREDERIC K. BUTTERS, B.S., B.A., Assistant Professor of Botany
LOUIS J. COOKE, M.D., Director of Physical Education for Men
WILLIAM S. COOPER, Ph.D., Assistant Professor of Botany
ELIAS J. DURAND, B.A., Professor of Botany
WILLIAM K. FOSTER, LL.M., Assistant Director of Physical Education for Men
FRANK F. GROUT, M.S., Assistant Professor of Geology and Mineralogy
ARTHUR T. HENRICI, M.D., Assistant Professor of Pathology and Bacteriology
NED L. HUFF, M.A., Assistant Professor of Botany
WILLIAM H. HUNTER, Ph.D., Associate Professor of Organic Chemistry
LAUDER W. JONES, Ph.D., Professor of Chemistry
FRANCIS B. KINGSBURY, Ph.D., Assistant Professor of Physiological Chemistry
MAY S. KISSOCK, B.A., Assistant Professor of Physical Education for Women
LEE I. KNIGHT, Ph.D., Professor of Botany
WINFORD P. LARSON, M.D., Professor of Bacteriology
ELIAS P. LYON, Ph.D., M.D., Professor of Physiology
J. F. MCCLENDON, Ph.D., Associate Professor of Physiology
EDWIN L. NEWCOMB, Phm.D., Associate Professor of Pharmaceutical Botany and Pharmacognosy
ALLEN T. NEWMAN, Captain, B.Sc., United States Army, Assistant Professor of Military Science and Tactics
J. ANNA NORRIS, M.D., Professor of Physical Education for Women
CHAUNCEY J. V. PETTIBONE, Ph.D., Assistant Professor of Physiological Chemistry
CHARLES H. ROGERS, M.S. in Phm., D.S. in Phm., Assistant Professor of Pharmaceutical Chemistry and Pharmacy
CARL O. ROSENDAHL, Ph.D., Professor of Botany
FREDERICK H. SCOTT, Ph.D., M.B., Sc.D., Professor of Physiology
CHARLES F. SIDENER, B.S., Professor of Chemistry

M. CANNON SNEED, Ph.D., Associate Professor of Chemistry
JOSEPHINE E. TILDEN, M.S., Professor of Botany
M. RUSSEL WILCOX, M.D., Assistant Professor of Physiology
CHARLES N. MCCLOUD, Phm.D., M.D., Lecturer on First Aids to the In-
jured
ANNE BENTON, M.A., Instructor in Bacteriology
OSCAR J. BLOSMO, Phm.C., M.S. in Phm., Instructor in Dispensing
ESTHER GREISHEIMER, B.S., Instructor in Physiology
JOSEPH HAVLICEK, Sergeant, United States Army, Retired, Instructor in
Military Science and Tactics
VALERIA G. LADD, B.A., Instructor in Physical Education for Women
CARL B. ROEMER, Instructor in Physical Education for Men
BERT A. ROSE, Instructor of Band
GERTRUDE B. SCHILL, B.A., Instructor in Physical Education for Women
ALICE H. TOLG, M.D., Instructor in Physical Education for Women
FRANK C. WHITMORE, Ph.D., Instructor in Chemistry
GUY H. WOOLLETT, Ph.D., Instructor in Chemistry
HALLIE F. E. BRUCE, Phm.G., Assistant in Dispensary Practice
LOIS CLARK, M.A., Assistant in Botany
CHARLES C. GAULT, B.A., Assistant in Physiology
ROBERT G. GREEN, Assistant in Bacteriology
SIEGFRIED HERRMANN, B.S., Assistant in Bacteriology
ESTHER C. JOHNSON, Ph.G., Assistant in Dispensary Practice
JOHN L. MILLS, B.S., Assistant in Physiology
HERMAN J. MOERSCH, B.S., Assistant in Physiology
VINNIE A. PEASE, M.S., Assistant in Botany
CHARLES V. NETZ, Student Helper
DEL D. TURNER, Laboratory Instructor

GENERAL INFORMATION

The twenty-eighth annual course of the College of Pharmacy begins and ends as per calendar on preceding pages.

ENTRANCE REQUIREMENTS

ADMISSION BY CERTIFICATE

Diplomas, certificates, or other evidences of the completion of an accredited four-year high-school course, or of its educational equivalent, are required for admission. The high-school course must have included:

1. English 4 units
 or English 3 units
 and a foreign language..... 2 units
2. Mathematics
 Elementary algebra 1 unit
 Plane geometry 1 unit
3. Latin 1 unit
4. Enough additional work to make in all 15 units, of which not more than 4 may be in Group F.

Prospective students in pharmacy are urged to secure high-school preparation in physics, chemistry, botany, and physiology.

Group F consists of high-school vocational and miscellaneous subjects. Not more than 4 units and studies in this group may be counted toward admission. The subjects are no longer designated by the University. The applicant is free to present in this division such studies as are not listed in other groups, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

ADMISSION BY EXAMINATION

Students may take examinations in subjects for which they have no certificates. A high-school training covers a minimum of fifteen units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations in respective high-school subjects.

NEW STUDENTS

All applicants for admission should request their high-school principals or superintendents to send a complete transcript of their records to the Registrar of the University as early as possible and not later than September 1. Upon receipt of the credentials the Registrar will notify the applicant concerning his admission and will forward directions for registration. See calendar for registration dates.

OLD STUDENTS

In August the Registrar will send to all students who were in college the preceding year complete registration material. Those who fail to re-

ceive this by August 20 should write for proper blanks. See calendar for dates of registration and payment of fees.

FEES AND OTHER EXPENSES

The quarterly tuition fee of \$18 includes all laboratory fees, and is payable at the beginning of each quarter. Certificates entitling the student to admission to classes will not be issued until the fees have been paid.

All students are required to pay the following fees:

Annual deposit covering all laboratories, etc.....	\$5.00
Minnesota Union membership, (required of men), a quarter	.70
Condition examination fee, each subject.....	1.00
Health fee (a quarter).....	2.00
Gymnasium suit, for those electing this work.....	5.00

Those desiring to take special work may pay fees on a clock hour basis, the rate being \$1 an hour; e.g., a student doing 15 hours of work a week throughout the quarter, would pay \$15. The minimum fee is \$10 per quarter.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course for which they have matriculated.

Every person upon whom any degree is conferred must be of good moral character and at least twenty-one years old; must have attended three full lecture and laboratory courses, the last at this College, and must have passed examinations in the subjects required for graduation.

Drug-store experience is not a requirement for graduation.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Academically qualified persons desiring to do less than the work of the regular course may be admitted as unclassified or special students provided there is laboratory room for them. They will not be rated in their work or examined unless they make special request therefor. Work completed satisfactorily will be credited should the students subsequently

enter the regular course, providing they meet the full entrance requirements. Registered pharmacists who desire to take certain branches of study may avail themselves of any of the College facilities.

EXAMINATIONS AND STANDINGS

Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (conditioned), I (incomplete), and F (failure). Conditions may be removed as indicated below. Incomplete work must be made up before the next final examination in the subject.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

Students having conditions in more than two major or in more than three minor subjects of the first year can not enter upon the second year's work. Candidates for graduation must have removed all conditions before entering upon the third quarter of the graduating year.

Condition examinations are held during the first and last week of each quarter. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given. A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absence will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this College, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Textbooks may be obtained after coming to the University.

Students find their time fully occupied.

MEDICINAL PLANT LABORATORY AND GARDEN

Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the educational facilities of the College. The College has no experience or information concerning the commercial cultivation of medicinal plants.

DISPENSARY PRESCRIPTION PRACTICE

The seniors under competent direction and supervision dispense the prescriptions written by the physicians in the Out-Patient Department of the University Hospitals. During the past year upwards of twenty-three thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

ELECTIVES IN OTHER UNIVERSITY COLLEGES

Students may elect certain subjects in other University colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the Dean and must be satisfactorily completed before the student can graduate.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In many states, including Minnesota, such training is now obligatory by law. In a number of other states credit is given for college work. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug-store experience before they become eligible for examination for full registration.

SCHOLARSHIPS

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP

The Minnesota State Pharmaceutical Association at its last meeting voted the sum of \$75 to be awarded annually to that student who is a citizen of the United States and who has resided in Minnesota for at least five years and who has earned the highest general rating in the work of the second year of the regular course in this College. If such student should discontinue attendance at the College, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

THE FAIRCHILD SCHOLARSHIP

Mr. Samuel W. Fairchild offers a scholarship in the sum of \$300 to be awarded to that graduate student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who has had two years of drug-store experience, is a high-school graduate, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy. Fuller particulars may be had from the Dean of the College.

POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This College is recognized in all states, including those in which standards of efficiency have been established.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the College four times each year to examine candidates for registration. For information concerning the Board or state examinations, address the Secretary of the Board, Mr. E. A. Tupper, 745 E. Fourteenth St., Minneapolis, Minnesota.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

This College is a member of the American Conference of Pharmaceutical Faculties whose object is the promotion of higher pharmaceutical education. Through the influence of the Conference higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the Conference. Member-colleges must maintain certain minimum entrance and graduation requirements. This College exceeds these requirements.

THE NORTHWESTERN BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

COMMUNICATIONS

Address communications not relating to registration to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota.

For further information see General Information bulletin.

COURSES OF STUDY

Four graded courses are authorized by the Regents leading respectively to the degrees Pharmaceutical Chemist, Bachelor of Science in Pharmacy, Master of Science in Pharmacy, and Doctor of Science in Pharmacy. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six or more years.

THE REGULAR COURSE

This course now extends over a period of three full University years. The lengthening of the regular course from two to three years has been approved by the Minnesota State Pharmaceutical Association and by the Minnesota State Board of Pharmacy. The curriculum of this course is described in the following pages, but its division among the three years may be changed as experience may warrant.

OUTLINE OF THE REGULAR THREE-YEAR COURSE

(Subject to change)

FRESHMAN

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Botany	Botany	Botany
General Chemistry	General Chemistry	General Chemistry
Military Training	Military Training	Military Training
Pharmacy	Pharmacy	Pharmacy
Pharmac. Chemistry, Didactic	Pharmac. Chemistry, Didactic	Pharmac. Chemistry, Didactic
Pharmacognosy	Pharmacognosy	Pharmacognosy

JUNIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Materia Medica	Materia Medica	Materia Medica
Qualitative Chemistry	Organic Chemistry	Organic Chemistry
Pharmacognosy	Pharmacognosy	Pharmacognosy
Pharmac. Chemistry, Practical	Pharmac. Chemistry, Practical	U. S. P. Testing
Organic Pharmacy	U. S. P. Testing	Operative Pharmacy
Military Training	Military Training	Military Training

SENIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Dispensing	Dispensing	Dispensing
U. S. P. Assay	U. S. P. Assay	U. S. P. Assay
Bacteriology	Therapeutics	Mineralogy and Crystallog.
Organic Pharmac. Analysis	Organic Pharmac. Analysis	Organic Pharmac. Analysis
Dispensary Practice	Physiology	Physiological Assay
	Dispensary Practice	Law and Ethics
		Dispensary Practice

THE FOUR-YEAR COURSE

The four-year course includes all of the regular three-year course and in addition Rhetoric 9 credits, any modern language 9 credits, Physics 9 credits, and electives sufficient to total at least 18 additional credits. Students who have completed this academic or pre-pharmacy work in the College of Science, Literature, and the Arts, or in a college of corresponding standing, are eligible for entrance upon the second year of this course. The degree for this course can not be granted except for four years of work in residence, of which at least the fourth year must be taken in residence at this College.

CREDIT VALUE

The credit values of courses were changed September, 1918. Now a credit value covers one period of lecture or recitation or two periods of laboratory work per week per quarter. The numbers expressing the credit value of courses are now fifty per cent greater than formerly.

DEPARTMENTAL STATEMENTS

BACTERIOLOGY

Professor WINFORD P. LARSON; Assistant Professor ARTHUR T. HENRICI;
Instructor ANNE BENTON; Assistants SIEGFRIED F. HERRMANN,
ROBERT G. GREEN.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
6f, w, s.	Elementary Bacteriology	5	Sr.	None
For additional courses see the bulletin of the Medical School.				

6f, w, s. ELEMENTARY BACTERIOLOGY. Lecture and laboratory course. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. LARSON, BENTON, HERRMANN, GREEN.

BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule two two-hour periods a week during the second semester of the graduating year for this kind of work. A room has been reserved for this purpose in the Pharmacy Building. To make this work of the utmost value the pharmaceutical library is being enlarged.

BOTANY

Professors C. OTTO ROSENDAHL, ELIAS J. DURAND, LEE I. KNIGHT,
JOSEPHINE E. TILDEN; Assistant Professors FREDERIC K. BUTTERS,
WILLIAM S. COOPER, NED L. HUFF; Assistants LOIS CLARK, VINNIE
A. PEASE.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
17f-18w-19s.	General Botany Total	7	Fr.	None

17f-18w-19s. GENERAL BOTANY AND GREENHOUSE WORK. Study of external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outlines of classification of flowering plants. Lectures, laboratory work, field work. BUTTERS, CLARK.

COLLEGE OF PHARMACY

CHEMISTRY

Professor LAUDER W. JONES; Associate Professors WILLIAM H. HUNTER, M. CANNON SNEED; Instructors FRANK C. WHITMORE, GUY H. WOOLLETT; Assistants.....

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, 2w, 3s	Gen. Inorganic Chemistry....	4	Fr.	None
11f	Qualitative Analysis	4	Soph.	1, 2, 3
31w-32s	Elementary Org. Chemistry..	4	Soph.	1-2-3, 11

- I. GENERAL INORGANIC CHEMISTRY. A study of the general laws of chemistry and of the non-metals and their compounds. WHITMORE and Assistants.
2. GENERAL INORGANIC CHEMISTRY. A continuation of Course 1. WHITMORE and Assistants.
3. GENERAL INORGANIC CHEMISTRY. A study of the metals and their compounds. A continuation of Course 2. WHITMORE and Assistants.
- II. QUALITATIVE CHEMICAL ANALYSIS. Laboratory work in systematic qualitative analysis with lectures on solution, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. For students who satisfy the requirements of General Chemistry.
- 31-32. ORGANIC CHEMISTRY. This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds. HUNTER, WOOLLETT, and Assistants.

CLINICAL MICROSCOPY

Professor.....; Instructor.....

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s.	Clinical Chemistry and Microscopy	Total 1	Sr.	None
1s.	CLINICAL CHEMISTRY AND MICROSCOPY. Includes (a) the microscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc.			

DISPENSARY PRESCRIPTION PRACTICE

Instructor OSCAR J. BLOSMO; Assistants HALLIE BRUCE, ESTHER JOHNSON.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s.	Prescription Practice.....	Total 2½	Sr.	Pharm. 5

If, w, s. DISPENSARY PRESCRIPTION PRACTICE. The prescription dispensing for the Out-Patient Department of the University Hospitals is in charge of the College of Pharmacy. The senior students do the prescription work under competent direction. BLOSMO, BRUCE, JOHNSON.

FIRST AIDS TO THE INJURED

Lecturer CHARLES N. MCCLOUD and Assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s.	Emergency Cases	Total 1	Fr.	None

1s. EMERGENCY CASES. A series of lectures and demonstrations designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician. MCCLOUD.

MATERIA MEDICA

Professors EDWIN L. NEWCOMB, WULLING and Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s.	Inorganic Materia Medica.....	1	Fr.	None
2w, s.	Organic Materia Medica.....	6	Fr., jr.	1

1f, w. INORGANIC MATERIA MEDICA. This course runs concurrently and in close relationship with Pharmacy 8 and 11. WULLING and Assistants.

2w, s. ORGANIC MATERIA MEDICA. The identity, sources, habitat, family, constituents, and preparations of the U. S. P., and of some unofficial vegetable drugs are studied in this course. NEWCOMB and Assistants.

MILITARY SCIENCE AND TACTICS

Colonel FRANK H. BURTON, U. S. Army, Professor of Military Science and Tactics, Head of the Department, Commandant; Lieutenant HENRY C. BERTELSEN, U. S. Army, Assistant Professor of Military Science and Tactics; Captain ALLEN T. NEWMAN, U. S. Army, Assistant Professor of Military Science and Tactics; Sergeant JOSEPH HAVLICEK, U. S. Army, Retired, Instructor; BERT A. ROSE, Band Instructor.

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their courses unless they have secured such training at an approved institution endorsed by the Military Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All students who have completed two years of military instruction may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course; the completion of this work is a prerequisite to promotion.

Juniors and seniors who take the course required by General Orders No. 49, will receive an allowance of forty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens Training Camps in time of peace and commission in the United States Volunteers in time of war, such officers having preference for commissions in the volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of practical and two of theoretical work in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing on the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and such additional credits as the respective curricula of the colleges may permit.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

PHARMACY

Professor FREDERICK J. WULLING; Associate Professor GUSTAV BACHMAN;
Assistant Professor CHARLES H. ROGERS; Instructor OSCAR J. BLOSMO;
Assistant DEL D. TURNER.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f	History of Pharmacy.....	¾	Fr., jr.	None
3f	Metrology	4½	Fr., jr.	None
5w	Physics of Pharmacy.....	4½	Fr., jr.	3f
7s	Pharmaceutical Processes	5	Fr., jr.	5w
2s	Pharmacopoeial Preparations ...	7½	Fr., jr.	7s
4f, w, s	Pharmacy Quiz	4½	Fr., jr.	3f, 5w, 7s, 2s
6w, s	Identification Inorganic U. S. P. Preparations	2	Fr., jr.	2s
9f	Pharmaceutical Chemical Phi- losophy	3	Fr., jr.	None

No.	Title	Credits	Offered to	Prereq. courses
11w	Pharmaceutical Chemistry of the Non-Metals	3	Fr., jr.	9f
8s	U. S. P. Inorganic Salts.....	3	Fr., jr.	9f
13f	Classification of Pharmaceutical Organic Compounds	1½	Jr., sr.	8s
15f, w, s	U. S. P. Organic Compounds and Their Preparations.....	9	Jr., sr.	13f
17f	Pharmacopoeial Qualitative Anal.	7½	Jr., sr.	11w
18w	Pharmacopoeial Quant. Anal....	3	Jr., sr.	17f
19f, w, s	Prescription Incompatibility ...	2	Jr., sr.	None
21f, w, s	Prescription Dispensing	18	Jr., sr.	None
8a, w	Manufacture U. S. P. Inorganic Salts	6	Jr., sr.	8s
10w	National Formulary	1½	Jr., sr.	15, 8a, w
12w	Pharmaceutical Assay	2	Jr., sr.	10w
14w	Synthetic Remedies	1	Jr., sr.	15
16w	Homeopathic Pharmacy	1	Jr., sr.	21
25w, s	Identification U. S. P. Organic Salts	2	Jr., sr.	8s, 15
20s	Microchemistry .....	..	.....	.....
27	Mathematics of Pharmacy.....	1	Fr., jr.	3f
29f, w, s	Drug and Food Analysis.....	24	Sr.	.....

- 1f. HISTORY OF PHARMACY. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. WULLING.
- 3f. METROLOGY. A critical study of weights and measures and balances; specific gravity, specific volume; alligation, etc. ROGERS, TURNER, NETZ.
- 5w. THE PHYSICS OF PHARMACY. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. ROGERS, TURNER, NETZ.
- 7s. PHARMACEUTICAL PROCESSES. A study of the various laboratory processes employed in pharmaceutical manufacture. ROGERS, TURNER, NETZ.
- 2s. PHARMACOPOEIAL PREPARATIONS. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulae and processes. ROGERS, TURNER, NETZ.
- 4f, w, s. PHARMACY QUIZ. A thoro review of the work covered in Courses 3f, 5w, 7s, and 2s. ROGERS.
- 6w, s. IDENTIFICATION OF INORGANIC U. S. P. PREPARATIONS. The study of the appearance and physical properties of inorganic official preparations. ROGERS, TURNER, NETZ.
- 9f. PHARMACEUTICAL CHEMICAL PHILOSOPHY. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. WULLING.

- 11w. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS. A study of the description, properties, pharmacy, and manufacture of the non-metals used in pharmacy, including their U. S. P. preparations. WULLING.
- 8s. U. S. P. INORGANIC SALTS. Especial reference to sources, description, properties, and manufacture. WULLING.
- 8a,w. MANUFACTURE OF U. S. P. INORGANIC SALTS. The preparation of upwards of forty official salts included in this course. ROGERS, BACHMAN, TURNER, NETZ.
- 13f. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS. A preparation for Pharmacy 15-16. WULLING, ROGERS.
- 15f, w, s. U. S. P. ORGANIC COMPOUNDS AND THEIR PREPARATIONS. Includes the critical study of cellulose and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc. ROGERS.
- 17f. PHARMACOPOEIAL QUALITATIVE ANALYSIS. A critical study of the identity, purity, limit, and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. BACHMAN, TURNER.
- 18w. PHARMACOPOEIAL QUANTITATIVE ANALYSIS. This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay (12w). BACHMAN, TURNER.
- 19f, w, s. PRESCRIPTION INCOMPATIBILITY. Therapeutic, pharmaceutical, and chemical incompatibility is taken up in lecture and recitation work preliminary to Course 21. BACHMAN.
- 21f, w, s. PRESCRIPTION DISPENSING. This course runs concurrently and in coöperation with Dispensary Prescription Practice 1f,w,s, and includes the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. BACHMAN, BLOSMO, TURNER.
- 10w. NATIONAL FORMULARY. This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. BACHMAN, TURNER.
- 12w. PHARMACEUTICAL ASSAY. The quantitative determination of alkaloidal and other active constituents of a number of the potent U. S. P. organic drugs and preparations. BACHMAN, TURNER.
- 14w. SYNTHETIC REMEDIES. The study of the pharmaceutical chemistry of synthetic chemicals in medical use. ROGERS.

- 16w. HOMEOPATHIC PHARMACY. A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. WULLING, BACHMAN.
- 25w,s. IDENTIFICATION OF U. S. P. SALTS. The study of the physical identity of the more important official inorganic and organic salts. BACHMAN, ROGERS, TURNER.
- 20s. MICROCHEMISTRY. Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. WULLING, BACHMAN, NEWCOMB, ROGERS.
27. MATHEMATICS OF PHARMACY. While students are required to have a preparation in arithmetic, algebra, and geometry before entering, they receive frequent drills throughout the year. Examinations in the subject are required. WULLING, BACHMAN, BLOSMO, ROGERS.
- 29f, w, s. DRUG AND FOOD ANALYSIS. A course designed to prepare students for commercial pharmaceutical analytical work. ROGERS, NETZ.

PHARMACEUTICAL AND BUSINESS LAW

Professor FREDERICK J. WULLING.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Ethics and Law for Pharmacists.....	2	Sr.	None
2s	Minnesota Pharmacy Laws.....	1/3	Sr.	None

- 1s. LAW FOR PHARMACISTS. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy and discuss the liability of retail pharmacists. WULLING.
- 2s. MINNESOTA PHARMACY LAWS. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Assistant Professor FRANK F. GROUT, and Assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Mineralogy	1	Sr., grad.	None
2s	Crystallography	1	Sr., grad.	1s

- 1s. MINERALOGY. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relation. GROUT.

- 2s. CRYSTALLOGRAPHY. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. GROUT.

PHARMACOGNOSY

Associate Professor EDWIN L. NEWCOMB and Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Medicinal Plant Study.....	6	Fr.	None
2w	The Thallophytes, Archegoniates, and Gymnosperms		Fr.	1
3s	Pharmaco-Histology	15	Fr.	2w, Mat. Med. 1fws
4f	Drug Collection		Jr.	3s
5w	The Angiosperms		Jr.	3s
6s	Field Work.....		Jr.	1s
7w	Physiological Drug Assay.....	3	Sr.	5w
8ws	Advanced Pharmacognosy.....	3	Sr.	5w

- 1s. MEDICINAL PLANT STUDY AND DRUG PREPARATIONS. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. NEWCOMB and Assistants.
- 2w. THE PHARMACOGNOSY OF THE THALLOPHYTES, ARCHEGONIATES, AND GYMNOSPERMS. In this course some of the drugs and economic products obtained from the thallophytes, archegoniates, and gymnosperms are studied. NEWCOMB and Assistants.
- 3s. PHARMACO-HISTOLOGY. Includes the micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by about forty official and unofficial drugs. NEWCOMB and Assistant
- 4f. DRUG COLLECTION AND PREPARATION. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. NEWCOMB and Assistants.
- 5w. PHARMACOGNOSY OF THE ANGIOSPERMS. Includes the scientific study of the official crude and powdered seeds, roots, rhizomes, barks, woods, pith, flowers, fruits, leaves, herbs, exudations, animal drugs, etc., and their adulteration. NEWCOMB and Assistants.
- 6s. FIELD WORK. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. NEWCOMB.
- 7w. PHYSIOLOGICAL DRUG ASSAY. The pharmacopoeial and the more important unofficial methods of biologic assay of drugs and their preparations are studied. NEWCOMB.

8w, s. ADVANCED PHARMACOGNOSY. Designed to give students a working knowledge of the use of the more important microscopical accessories in advanced pharmacognostic work. NEWCOMB.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructor CARL B. ROEMER.

The purpose of the department is to provide all men of the University opportunities for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
if	Personal Hygiene	None	All	None

if. PERSONAL HYGIENE. Two hours per week; first six weeks of first semester. Examination at close of course. COOKE.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn semester, with required attendance on the part of all freshmen.

PHYSICAL EDUCATION

FOR WOMEN

Professor J. ANNA NORRIS; Assistant Professor MAY S. KISSOCK; Instructors VALERIA G. LADD, GERTRUDE B. SCHILL, ALICE H. TOLG.

This department aims to promote the health of the women students. It gives physical examination and advice to all on entrance; plans systematically to keep in close touch with them during their first year in col-

lege; conducts yearly consultations with, and examines when necessary, all upper class students; gives courses in hygiene; organizes physical work to meet the varying needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department is required of all newly entering students (see Course 11f), of sophomores who can not pass the swimming examination, and of all students permitted, for reasons connected with their physical condition, to carry less than the minimum number of credit hours. Physical examinations or consultations required annually of all students.

Elective classes arranged in gymnastics, dancing, swimming, fencing, basket-ball, baseball, and other activities.

For requirements for a teacher's certificate see Bulletin of the College of Education.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f-2w-3s	Elementary Physical Training....	None	Required of all	None
11f	Preliminary Hygiene	None	new students	
		None	All new students	None

1f-2w-3s. ELEMENTARY PHYSICAL TRAINING. Lighter forms of gymnastics; gymnastic dances; indoor and outdoor games. Study of daily habits of living. Shower bath fee, \$1 per quarter. KISSOCK, LADD, SCHILL, TOLG.

11f. PRELIMINARY HYGIENE. One lecture a week. The most essential aspects of the care of the body. NORRIS.

THE DEPARTMENT OF PHYSIOLOGY

Professors ELIAS P. LYON, FREDERICK H. SCOTT; Associate Professors RICHARD OLDING BEARD, J. F. McCLENDON; Assistant Professors FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE, M. RUSSEL WILCOX; Instructor ESTHER GREISHEIMER; Assistants CHARLES C. GAULT, JOHN L. MILLS, HERMAN J. MOERSCH; Teaching Fellow.....

COURSES

3f, w, s, su. HUMAN PHYSIOLOGY. Science, Literature, and the Arts, School for Nurses, Home Economics, Dental students and others. Prerequisites: elementary biology and chemistry. Lectures and laboratory. Repeated each quarter. 5 qtr. cr. LYON, BEARD, and Assistants.

4f, w, s, su. Same as Course 3 without laboratory. Pharmacy students and others.

6s, su. PHYSIOLOGIC CHEMISTRY. Dental students and others. Prerequisite: organic chemistry. 3 qtr. cr. PETTIBONE, and Assistants.

THERAPEUTICS AND TOXICOLOGY

Associate Professor EDGAR D. BROWN.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
15	Therapeutics and Toxicology.....	3	Jr.	Pharmacognosy 5w & Mat. Med. 1fw, 2ws

15. THERAPEUTICS AND TOXICOLOGY. Drugs are studied in groups as governed by their medicinal and toxic properties. Remedial measures other than those depending upon drugs are fully considered. Poisonous action and doses of drugs also receive consideration. BROWN.

STUDENTS

1918-1919

FIRST-YEAR

Abrahamson, Myrtle F., Red Lodge, Mont.

Alsleben, Gustav H., Glencoe

Anderson, Arthur M., Amery, Wis.

Angier, Lloyd H., Litchfield

Bergh, Hjalmar I., Dawson

Bessler, Benjamin, Minneapolis

Blair, John H., Herreid, S. D.

Bryan, Verle S., Minneapolis

Carlson, Astrid A., Minneapolis

Carlson, Blenda, Minneapolis

Comstock, Reginald W., Rochester

Cosgrove, John J., Green Isle

Dargavel, Warren C., Morristown

Dawley, Walter A., DeSmet, S. D.

Edlund, John, Minneapolis

Engen, Gladys M., Minneapolis

Erickson, Frans J., Kandiyohi

Faedtke, Waldemar W., Wheaton

Feinstein, Louie, Sioux Falls, S. D.

Folkestad, C. Walter, Lambert, Mont.

Fritzen, Carl P., Duluth

Gale, R. Glyde, Minneapolis

Geib, Irene E., Minneapolis

Gunderson, Ralph L., Wheaton

Harder, Adelmor M., Cando, N. D.

Haugh, Patrick F., Blakeley

Haywood, H. Parker, Osakis

Hoff, George A., Hixton, Wis.

Hogan, Thomas F., South St. Paul

Holtz, Harvey E., Waseca

Hutchins, Ezra H. C., Minneapolis

Johnson, Florence C., Belle Plaine

Johnson, L. Dewey, Litchfield

Johnson, Leonard F., Barron, Wis.

Johnson, Ruby G., Wayzata

Johnson, Wesley H., Minneapolis

Jones, Ruth, Clark, S. D.

Jones, Victor E., Clark, S. D.

Keller, Keith K., Dallas, Wis.

Kletzin, William N., Minneapolis

Kristensen, Willard S., Wheaton

Lambert, Cyril E.,

Lark, George C., Minneapolis

Larkin, Francis A., Janesville

Libra, Ivan L., Glencoe

Lighthall, Margaret, Minneapolis

Lundman, Edwin N., Buffalo

Malia, Francis E., Monticello

March, Kenneth A., Hot Springs, S. D.

Markus, Mitchell, Minneapolis

Modig, Myron S., Kerkhoven

Moll, John A., Parker's Prairie

Neiman, Arthur E., Minneapolis

Nelson, Arthur E., Fergus Falls

Nelson, Edwin F., Milaca

Nelson, Gustave N., DeSmet, S. D.

Nelson, Reuben A., Lindstrom

Nichols, Josephine A., Mazeppa

Nisbett, Beulah P., Grand Rapids

Nordstrom, Evelyn A., Sacred Heart

Olander, Uno H., Duluth

Penton, Levis, Black River Falls, Wis.

Peterson, Clifford A., Alexandria

Perry, Ellsworth, Rochester

Prochaska, George A., Beroun

Putney, Byron W., Hutchinson

Remes, Jacob H., New Prague

Robbins, Edward G., Redfield, S. D.

Roberts, James E., Minneapolis

Rosell, Joseph A., Rush City

Ross, Ione I., Ortonville

Sanderson, Mildred E., Stephen

Shannon, Warren J., Winnebago

Sherwood, J. Vincent, Doland, S. D.

Silverman, Mitchell I., Minneapolis

Slatten, Hiram I., Fergus Falls

Smetana, Harold W., Hopkins

Sogard, Tinita, Minneapolis

Steinman, William W., Minneapolis

Storaker, Malvin E., Montevideo

Swanson, Ernest G., Hopkins

Taylor, Angus H., Owatonna

Tidberg, Edwin, Buffalo

Walechka, Louis F., Owatonna

Walt, Israel, Duluth

Weisberg, Frank E., Minneapolis

Wiger, Carsten, Minneapolis

Wilson, Charles K., Rush City

Youngstrom, Lloyd O., Litchfield

SECOND-YEAR

Abbotts, T. Harold, Caledonia	Malerich, Elizabeth M., Little Falls
Aldes, Antoinette, St. Paul	Petterson, Clarence N., Battle Lake
Blanchette, John J., Anoka	Schiesser, Elizabeth M., Miles City, Mont.
Boothroyd, Margaret, Minneapolis	Siperstein, Anne E., Minneapolis
Chambers, Charles M., Minneapolis	Spetz, Esther, Bismarck, N. D.
Choudek, Beatrice B., Seaforth	Thibodeau, Leonard L., Faribault
Clark, Walker E., Minneapolis	Vogel, Vivian V., Minneapolis
Cohler, Sara B., St. Paul	Wexler, Max, Minneapolis
Dargavel, James B., Morristown	White, Ruth M., Buffalo
Goldner, Sigurd, Minneapolis	

SPECIAL SECOND-YEAR

Baines, Wiley C., Monticello, Arkansas

THIRD-YEAR

Anderson, Harley E., Whalan	Netz, Charles V., Owatonna
Aurness, Rolf C., Minneapolis	Newhouse, Edna V. L., Minneapolis
Carlson, Roy W., Willmar	Quast, William J., Janesville
Gross, Howard S., Watertown, S. D.	Rasmussen, Ethel, Lake Preston, S. D.
Holec, Rose L., New Prague	Sugarman, Joseph B., Minneapolis
Kingman, Gerhart I., East Grand Forks	Taplin, Clifford F., Milroy
Mayo, James B., Miles City, Mont.	Wasielewski, Henry R., Minneapolis

FOURTH-YEAR

Bajpai, Ram Lal, Nagpur, India	Greenberg, Earl N., Minneapolis
O'Connell, Margaret H., Grand Rapids	

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1920/21

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The Bulletin of the University of Minnesota

*The College of Pharmacy
Announcement for the Year
1920-1921*



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1920

JULY

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AUGUST

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1921

JANUARY

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MARCH

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APRIL

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MAY

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JUNE

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AUGUST

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

SEPTEMBER

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

OCTOBER

..	2	3	4	..	5	6	1
9	10	11	12	13	14	15	8
16	17	18	19	20	21	22	19
23	24	25	26	27	28	29	..
30	31	..	..	..	..	..	..

NOVEMBER

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
..	..	..	..	..	..	..

DECEMBER

..	4	5	6	..	7	1	2	3
11	12	13	14	15	16	17	18	19
18	19	20	21	22	23	24	25	26
25	26	27	28	29	30	31	..	..
..	..	..	..	..	..	..	..	..

CALENDAR

1920-1921

1920

September	18	Saturday	Payment of fees closes, except for new students
September	20-25		Registration period, College of Science, Literature, and the Arts.
September	21-28	Week	Examinations for removal of conditions, and entrance examinations
			Registration period, College of Agriculture, Forestry, and Home Economics
September	27-28		Registration days for all colleges not indicated above
September	28	Tuesday	Payment of fees for new students closes
September	29	Wednesday	Fall quarter begins, 8:30 a.m.
October	21	Thursday	Senate meeting, 4:30 p.m.
November	2	Tuesday	Election Day; a holiday
November	25	Thursday	Thanksgiving Day; a holiday
December	16	Thursday	Senate meeting, 4:30 p.m.
December	22	Wednesday	Fall quarter ends, 5:20 p.m.
December	22	Wednesday	Christmas vacation begins, 5:20 p.m.

1921

January	4	Tuesday	Christmas vacation ends, 8:30 a.m.
January	4	Tuesday	Winter quarter begins, 8:30 a.m.
February	12	Saturday	Lincoln's Birthday; a holiday
February	17	Thursday	Senate meeting, 4:30 p.m.
February	22	Tuesday	Washington's Birthday; a holiday
March	24	Thursday	Winter quarter ends, 5:20 p.m.
March	24	Thursday	Spring vacation begins, 5:20 p.m.
March	30	Wednesday	Spring vacation ends, 8:30 a.m.
March	30	Wednesday	Spring quarter begins, 8:30 a.m.
May	19	Thursday	Senate meeting, 4:30 p.m.
May	30	Monday	Memorial Day; a holiday
June	12	Sunday	Baccalaureate service
June	14	Tuesday	Spring quarter closes, 5:20 p.m.
June	15	Wednesday	Forty-ninth annual commencement
June	17-18		Registration days for summer session
June	20	Monday	Summer session begins
July	30	Saturday	Summer session closes

THE COLLEGE OF PHARMACY

FACULTY

- MARION LeROY BURTON, Ph.D., D.D., LL.D., President¹
WILLIAM WATTS FOLWELL, LL.D., President Emeritus
CYRUS NORTHROP, LL.D., President Emeritus
FREDERICK J. WULLING, Phm.G., Phm.D., LL.M., Dean, Professor of Pharmacology, and Director of the University Medicinal Plant Gardens
GUSTAV BACHMAN, Phm.D., M.Phm., Professor of Pharmacy
RICHARD OLDING BEARD, M.D., Associate Professor of Physiology
EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology
FREDERIC K. BUTTERS, B.S., B.A., Associate Professor of Botany
LOUIS J. COOKE, M.D., Director of Physical Education for Men
WILLIAM S. COOPER, Ph.D., Assistant Professor of Botany
ELIAS J. DURAND, B.A., D.Sc., Professor of Botany
WILLIAM K. FOSTER, LL.M., Assistant Director of Physical Education for Men
ALBERT G. GOODWYN, Captain, U. S. A., Professor of Military Science and Tactics, Commandant
FRANK F. GROUT, M.S., Ph.D., Professor of Geology and Mineralogy
ARTHUR T. HENRICI, M.D., Assistant Professor of Pathology and Bacteriology
NED L. HUFF, M.A., Assistant Professor of Botany
WILLIAM H. HUNTER, Ph.D., Associate Professor of Chemistry
LAUDER W. JONES, Ph.D., Professor of Chemistry
FRANCIS B. KINGSBURY, Ph.D., Assistant Professor of Physiologic Chemistry
MAY S. KISSOCK, B.A., Assistant Professor of Physical Education for Women
LEE I. KNIGHT, Ph.D., Professor of Botany
WINFORD P. LARSON, M.D., Professor of Bacteriology
ELIAS P. LYON, Ph.D., M.D., Professor of Physiology
JESSE F. McCLENDON, Ph.D., Associate Professor of Physiology
EDWIN L. NEWCOMB, Phm.D., Professor of Pharmaceutical Botany and Pharmacognosy
J. ANNA NORRIS, M.D., Professor of Physical Education for Women
CHAUNCEY J. V. PETTIBONE, Ph.D., Assistant Professor of Physiologic Chemistry
CHARLES H. ROGERS, B.Sc., M.Phm., D.Sc. in Phm., Associate Professor of Pharmaceutical Chemistry and Pharmacy
CARL O. ROSENDAHL, Ph.D., Professor of Botany
FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Professor of Physiology
CHARLES F. SIDENER, B.S., Professor of Chemistry
M. CANNON SNEED, Ph.D., Associate Professor of Chemistry

¹Resigned July 1, 1920.

JOSEPHINE E. TILDEN, M.S., Professor of Botany
CHARLES N. MCCLOUD, Phm.D., M.D., Lecturer on First Aids to the In-
jured
GERTRUDE M. BAKER, Instructor in Swimming
HELEN A. BARR, B.A., Instructor in Physical Education
ANNE BENTON, M.A., Instructor in Bacteriology
OSCAR J. BLOSMO, Phm.C., M.S. in Phm., Instructor in Dispensing
EDWIN S. BROWN, M.D., Instructor in Physical Education for Men
CHARLES C. GAULT, B.A., Instructor in Physiology
PERCY C. GLIDDEN, Instructor in Swimming
ESTHER GREISHEIMER, Ph.D., B.S. in E., Instructor in Physiology
ARTHUR M. JOHNSON, Ph.D., Instructor in Botany
VALERIA G. LADD, B.A., Instructor in Physical Education for Women
CARL B. ROEMER, Instructor in Physical Education for Men
GERTRUDE B. SCHILL, B.A., Instructor in Physical Education for Women
ALICE H. TOLG, M.D., Instructor in Physical Education for Women
DEL D. TURNER, Phm.C., Laboratory Instructor in Pharmacy
GUY H. WOOLLETT, Ph.D., Instructor in Chemistry
HALLIE F. E. BRUCE, Phm.G., Assistant in Dispensary Practice
ROBERT G. GREEN, Assistant in Bacteriology
OLIVER GUILBERT, Phm.C., Assistant in Pharmacy
CHARLES V. NETZ, Phm.C., Assistant in Pharmacy
EDNA NEWHOUSE, Phm.C., Assistant in Dispensary Practice
LOUIS WALECHKA, Assistant in Pharmacy

¹On leave of absence, 1920-1921.

GENERAL INFORMATION

The twenty-ninth annual course of the College of Pharmacy begins and ends as announced in the calendar on preceding pages.

ENTRANCE REQUIREMENTS

ADMISSION BY CERTIFICATE

Diplomas, certificates, or other evidences of the completion of an accredited four-year high-school course, or of its educational equivalent, are required for admission. The high-school course must have included:

1. English 4 units
 or English 3 units
 and a foreign language..... 2 units
2. Mathematics
 Elementary algebra 1 unit
 Plane geometry 1 unit
3. Latin 1 unit
4. Enough additional work to make in all 15 units, of which not more than 4 may be in Group F.

Prospective students in pharmacy are urged to secure high-school preparation in physics, chemistry, botany, and physiology.

Group F consists of high-school vocational and miscellaneous subjects. Not more than 4 units and studies in this group may be counted toward admission. The subjects are no longer designated by the University. The applicant is free to present in this division such studies as are not listed in other groups, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

The freshman class is limited to sixty students.

ADMISSION BY EXAMINATION

Students may take examinations in subjects for which they have no certificates. A high-school training covers a minimum of 15 units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations in respective high-school subjects.

NEW STUDENTS

All applicants for admission should request their high-school principals or superintendents to send a complete transcript of their records to the registrar of the University as early as possible and not later than September 1. Upon receipt of the credentials, the registrar will notify the applicant concerning his admission and will forward directions for registration. (See calendar for registration dates.)

OLD STUDENTS

In August the registrar will send to all students who were in college the preceding year complete registration material. Those who fail to receive this by August 20 should write for proper blanks. (See calendar for dates of registration and payment of fees.)

FEES AND OTHER EXPENSES

The quarterly tuition fee of \$30 for resident students and \$40 for non-resident students includes all laboratory fees, and is payable at the beginning of each quarter. Certificates entitling the student to admission to classes will not be issued until the fees have been paid.

All students are required to pay the following fees:

Annual deposit covering all laboratories, etc., except chemistry	\$10.00
Annual chemistry deposit	5.00
Minnesota Union membership (required of men), a quarter	.70
Shevlin fee (required of women), a quarter.....	.50
Condition examination fee, each subject.....	1.00
Health fee (a quarter).....	2.00
Gymnasium suit, for those electing this work.....	8.00

Those desiring to take special work may pay fees on a clock hour basis, the rate being \$1 an hour; e.g., a student doing 15 hours of work a week throughout the quarter, would pay \$15. The minimum fee is \$10 per quarter.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course for which they have matriculated.

Every person upon whom any degree is conferred must be of good moral character and at least twenty-one years old; must have attended three full lecture and laboratory courses, the last at this college; and must have passed examinations in the subjects required for graduation.

Drug-store experience is not a requirement for graduation.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Academically qualified persons desiring to do less than the work of the regular course may be admitted as unclassified or special students provided there is laboratory room for them. They will not be rated in their work or examined unless they make special request therefor. Work completed satisfactorily will be credited should the students subsequently enter the regular course, provided they meet the full entrance requirements. Registered pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

EXAMINATIONS AND STANDINGS

Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (conditioned), I (incomplete), and F (failure). Conditions may be removed as indicated below. Incomplete work must be made up before the next final examination in the subject.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

Students having conditions in more than two major or in more than three minor subjects of the first year can not enter upon the second year's work. Candidates for graduation must have removed all conditions before entering upon the third quarter of the graduating year.

Condition examinations are held during the first and last week of each quarter. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given. A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absence will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this college, subject to the approval of the dean. Opportunity is afforded to do advanced work in all branches. Textbooks may be obtained after coming to the University.

Students find their time fully occupied.

MEDICINAL PLANT LABORATORY AND GARDEN

Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the educational facilities of the college. The college has no experience or information concerning the commercial cultivation of medicinal plants.

DISPENSARY PRESCRIPTION PRACTICE

The seniors, under competent direction and supervision, dispense the prescriptions written by the physicians in the Out-Patient Department of the University Hospitals. During the past year upwards of twenty-eight thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

ELECTIVES IN OTHER UNIVERSITY COLLEGES

Students may elect certain subjects in other university colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the dean and must be satisfactorily completed before the student can graduate.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In many states, including Minnesota, such training is now obligatory by law. In a number of other states credit is given for college work. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug-store experience before they become eligible for examination for full registration.

SCHOLARSHIPS

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP

The Minnesota State Pharmaceutical Association awards annually \$90 to that student who is a citizen of the United States, who has resided in Minnesota for at least five years, and who has earned the highest general rating in the work of the second year of the regular course in this college. If such student should discontinue attendance at the college, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

THE FAIRCHILD SCHOLARSHIP

Mr. Samuel W. Fairchild offers a scholarship in the sum of \$300 to be awarded to that graduate student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who

has had two years of drug-store experience, is a high-school graduate, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy. Fuller particulars may be had from the dean of the college.

POSITIONS FOR GRADUATES

The demand for graduates of this college has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This college is recognized in all states, including those in which state standards of efficiency have been established.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the college four times each year to examine candidates for registration. For information concerning the board or state examinations, address the secretary of the board, Mr. H. Martin Johnson, Fourth and St. Peter Streets, St. Paul, Minn.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

This college is a member of the American Conference of Pharmaceutical Faculties, whose object is the promotion of higher pharmaceutical education. Through the influence of the conference, higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the conference. Member-colleges must maintain certain minimum entrance and graduation requirements. This college exceeds these requirements.

THE NORTHWESTERN BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

COMMUNICATIONS

Address communications not relating to registration to the dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota.

For further information see general information bulletin.

COURSES OF STUDY

Four graded courses leading respectively to the degrees Pharmaceutical Chemist, Bachelor of Science in Pharmacy, Master of Science in Pharmacy, and Doctor of Science in Pharmacy, are authorized by the regents. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded, and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six or more years.

THE PRESENT REGULAR COURSE

This course extends over a period of three full university years. The lengthening of the regular course from two to three years has been approved by the Minnesota State Pharmaceutical Association and by the Minnesota State Board of Pharmacy. The curriculum of this course is described in the following pages, but its division among the three years may be changed as experience may warrant.

OUTLINE OF THE REGULAR THREE-YEAR COURSE

(Subject to change)

FRESHMAN

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Botany	Botany	Botany
General Chemistry	General Chemistry	General Chemistry
Military training	Military training	Military training
Pharmacy	Pharmacy	Pharmacy
Pharmac. Chemistry,	Pharmac. Chemistry,	Pharmac. Chemistry,
Didactic	Didactic	Didactic
Pharmacognosy	Pharmacognosy	Pharmacognosy

JUNIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Materia Medica	Materia Medica	Materia Medica
Qualitative Chemistry	Organic Chemistry	Organic Chemistry
Pharmacognosy	Pharmacognosy	Pharmacognosy
Pharmac. Chemistry,	Pharmac. Chemistry,	U. S. P. Testing
Practical	Practical	Therapeutics
Military training	U. S. P. Testing	Operative Pharmacy
	Military training	Military training

SENIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Dispensing	Dispensing	Dispensing
U. S. P. Assay	U. S. P. Assay	U. S. P. Assay
Bacteriology	Drug and Food Analysis	Mineralogy and Crystallog.
Drug and Food Analysis	Physiology	Drug and Food Analysis
Dispensary Practice	Dispensary Practice	Physiological Assay
Organic Pharmacy		Law and Ethics
		Dispensary Practice

THE FOUR-YEAR COURSE

The four-year course includes all of the regular three-year course and in addition rhetoric, 9 credits, any modern language, 9 credits, physics, 9 credits, and electives sufficient to total at least 18 additional credits. Students who have completed this academic or pre-pharmacy work in the College of Science, Literature, and the Arts, or in a college of corresponding standing, are eligible for entrance upon the second year of this course. The degree for this course can not be granted except for four years of work in residence, of which at least the fourth year must be taken in residence at this college.

CREDIT VALUE

— The credit values of courses were changed September, 1918. Now a credit value covers one period of lecture or recitation or two periods of laboratory work per week per quarter. The numbers expressing the credit value of courses are now fifty per cent greater than formerly.

DEPARTMENTAL STATEMENTS

BACTERIOLOGY AND IMMUNOLOGY

Professor WINFORD P. LARSON; Assistant Professor ARTHUR T. HENRICI;
Instructor ANNE BENTON; Assistant ROBERT G. GREEN.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s, su	Elementary Bacteriology.....	5	Sr.	None

For additional courses see the bulletin of the Medical School.

1f, w, s, su. ELEMENTARY BACTERIOLOGY. Lecture and laboratory course. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. LARSON, BENTON, GREEN.

BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule two two-hour periods a week for this kind of work during the second quarter of the graduating year. A room has been reserved for this purpose in the Pharmacy Building. To make this work of the utmost value the pharmaceutical library is being enlarged.

BOTANY

Professors C. OTTO ROSENDAHL, ELIAS J. DURAND, LEE I. KNIGHT, JOSEPHINE E. TILDEN; Associate Professor FREDERICK K. BUTTERS; Assistant Professors WILLIAM S. COOPER, NED L. HUFF; Instructor ARTHUR M. JOHNSON; Assistants

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
17f-18w-19s	General Botany.....Total	7	Fr.	None

17f-18w-19s. GENERAL BOTANY AND GREENHOUSE WORK. Study of external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outlines of classification of flowering plants. Lectures, laboratory work, field work. BUTTERS.

CHEMISTRY

Professor LAUDER W. JONES; Associate Professor WILLIAM H. HUNTER;
Instructors GUY H. WOOLLETT; Assistants.....

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, 2w, 3s	Gen. Inorganic Chemistry.....	4	Fr.	None
11f	Qualitative Analysis.....	4	Soph.	1, 2, 3
31w-32s	Elementary Org. Chemistry...	4	Soph.	1-2-3, 11

1. GENERAL INORGANIC CHEMISTRY. A study of the general laws of chemistry and of the non-metals and their compounds. and Assistants.
2. GENERAL INORGANIC CHEMISTRY. A continuation of Course 1. and Assistants.
3. GENERAL INORGANIC CHEMISTRY. A study of the metals and their compounds. A continuation of Course 2. and Assistants.
11. QUALITATIVE CHEMICAL ANALYSIS. Laboratory work in systematic qualitative analysis with lectures on solution, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. For students who satisfy the requirements of general chemistry.
- 31-32. ORGANIC CHEMISTRY. This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds. HUNTER, WOOLLETT, and Assistants.

CLINICAL MICROSCOPY

Professor.....; Instructor.....

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Clinical Chemistry and Microscopy	Total 1	Sr.	None
1s.	CLINICAL CHEMISTRY AND MICROSCOPY. Includes (a) the microscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc.			

DISPENSARY PRESCRIPTION PRACTICE

Instructor OSCAR J. BLOSMO; Assistants HALLIE BRUCE,!

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s	Prescription Practice.....	Total 2½	Sr.	Pharm. 5
1f, w, s.	DISPENSARY PRESCRIPTION PRACTICE. The prescription dispensing for the Out-Patient Department of the University Hospitals is in charge of the College of Pharmacy. The senior students do the prescription work under competent direction. BLOSMO, BRUCE, NEWHOUSE.			

FIRST AIDS TO THE INJURED

Lecturer CHARLES N. McCLOUD and Assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Emergency Cases.....Total	1	Sr.	None

- 1s. EMERGENCY CASES. A series of lectures and demonstrations designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician. McCLOUD.

MATERIA MEDICA

Professors FREDERICK J. WULLING, EDWIN L. NEWCOMB, and Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s	Inorganic Materia Medica.....	1	Fr.	None
2w, s	Organic Materia Medica.....	6	Fr., jr.	1

- 1f, w. INORGANIC MATERIA MEDICA. This course runs concurrently and in close relationship with Pharmacy 8 and 11. WULLING and Assistants.

- 2w, s. ORGANIC MATERIA MEDICA. The identity, sources, habitat, family, constituents, and preparations of the U. S. P., and of some unofficial vegetable drugs are studied in this course. NEWCOMB and Assistants.

MILITARY SCIENCE AND TACTICS

Professor ALBERT G. GOODWYN, Captain, Infantry, U.S.A., Chairman; Assistant Professors BEN W. FIELD, Captain, Infantry, U.S.A.; LAURENCE T. WALKER, Captain, C.A.C., U.S.A.; LEE R. WATROUS, JR., Captain, C.A.C., U.S.A.; EDGAR B. MOOMAU, 1st Lieutenant, Infantry, U.S.A.; HARVEY G THOMAS, 1st Lieutenant, U.S.A., Retired; Instructors JOEL R. BAKER, Master Signal Electrician, Signal Corps, U.S.A.; ALFRED BRANDT, Regimental Sergeant Major, Infantry, U.S.A.; HENRY W. BROWN, Sergeant, Coast Artillery Corps, Unassigned, U.S.A.; KENNA B. CALDWELL, Sergeant, Coast Artillery Corps, Unassigned, U.S.A.; AUBREY R. DUNKUM, 1st Sergeant, Coast Artillery Corps, Unassigned, U.S.A.; WILLIAM FINKE, 1st Sergeant, Coast Artillery Corps, Unassigned, U.S.A.; JOSEPH HAVLICEK, Regimental Commissary Sergeant, Infantry, U.S.A., Retired; WILLIAM L. HOGAN, 1st Sergeant, Coast Artillery Corps, Unassigned, U.S.A.; INGVALD M. JOHNSON, 1st Sergeant, Infantry, Unassigned, U.S.A.; JOSEPH LEES, 1st Sergeant, Infantry, U.S.A., Retired; JOHN McWILLIAMS, 1st Sergeant, Infantry, U.S.A., Retired; WILLIAM G. PALMS, Sergeant, Infantry, Unassigned, U.S.A.

COURSES

No.	Title	Hrs.	Required of	Prereq. courses
1	First-Year Basic Course R.O.T.C.	3	†All fr.	None
2a	Second-Year Basic Course R.O.T.C., Infantry	3	Soph.	1
2b	Second-Year Basic Course R.O.T.C., Coast Artillery.....	3	Soph.	1
2c	Second-Year Basic Course R.O.T.C., Signal Corps.....	3	Soph.	1

†Must be legally eligible for enrollment in Reserve Officers' Training Corps.

PHARMACY

Professors FREDERICK J. WULLING, GUSTAV BACHMAN; Associate Professor CHARLES H. ROGERS; Instructors OSCAR J. BLOSMO, DEL D. TURNER; Assistants OLIVER GUILBERT, CHARLES V. NETZ, LOUIS WALECHKA.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f	History of Pharmacy.....	¾	Fr., jr.	None
3f	Metrology	4½	Fr., jr.	None
5f	Physics of Pharmacy.....	4½	Fr., jr.	3f
7w, s	Pharmaceutical Processes.....	5	Fr., jr.	5w
2w, s	Pharmacopoeial Preparations...	7½	Fr., jr.	7s
4f, w, s	Pharmacy Quiz.....	4½	Fr., jr.	3f, 5w, 7s, 2s
6w, s	Identification Inorganic U. S. P. Preparations	2	Fr., jr.	2s
9f	Pharmaceutical Chemical Phi- losophy	3	Fr., jr.	None
11w	Pharmaceutical Chemistry of the Non-Metals	3	Fr., jr.	9f
8s	U. S. P. Inorganic Salts.....	3	Fr., jr.	9f
13f	Classification of Pharmaceutical Organic Compounds.....	1½	Jr., sr.	8s
15f, w, s	Pharmaceutical Organic Com- pounds and Their Preparations	9	Jr., sr.	13f
17f	Pharmacopoeial Qualitative Anal.	7½	Jr., sr.	11w
18w	Pharmacopoeial Quant. Anal...	3	Jr., sr.	17f
19f, w, s	Prescription Incompatibility....	2	Jr., sr.	None
21f, w, s	Prescription Dispensing.....	18	Jr., sr.	None
8a, w, f	Manufacture Pharmaceutical In- organic Salts.....	6	Jr., sr.	8s
10w	National Formulary.....	1½	Jr., sr.	15, 8a, w
12w	Pharmaceutical Assay.....	2	Jr., sr.	10w
14w	Synthetic Remedies.....	1	Jr., sr.	15
16w*	Homeopathic Pharmacy.....	1	Jr., sr.	21
25w, s	Identification U. S. P. Organic Salts	2	Jr., sr.	8s, 15
20s	Microchemistry .....	..	.....	.....
27	Mathematics of Pharmacy.....	1	Fr., jr.	3f
29f, w, s	Drug and Food Analysis.....	24	Sr.	.....

1f. HISTORY OF PHARMACY. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. WULLING, ROGERS.

- 3f. METROLOGY. A critical study of weights and measures and balances; specific gravity, specific volume; alligation, etc. ROGERS, NETZ.
- 5w. THE PHYSICS OF PHARMACY. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. ROGERS, GUILBERT, NETZ, WALECHKA.
- 7s. PHARMACEUTICAL PROCESSES. A study of the various laboratory processes employed in pharmaceutical manufacture. ROGERS, NETZ.
- 2s. PHARMACOPOEIAL PREPARATIONS. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulæ and processes. ROGERS, GUILBERT, NETZ, WALECHKA.
- 4f, w, s. PHARMACY QUIZ. A thoro review of the work covered in Courses 3f, 5w, 7s, and 2s. ROGERS.
- 6w, s. IDENTIFICATION OF INORGANIC U. S. P. PREPARATIONS. The study of the appearance and physical properties of inorganic official preparations. ROGERS, NETZ.
- 9f. PHARMACEUTICAL CHEMICAL PHILOSOPHY. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. WULLING.
- 11w. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS. A study of the description, properties, pharmacy, and manufacture of the non-metals used in pharmacy, including their U. S. P. preparations. WULLING.
- 8s. U. S. P. INORGANIC SALTS. Especial reference to sources, description, properties, and manufacture. WULLING.
- 8a, w. MANUFACTURE OF PHARMACEUTICAL INORGANIC SALTS. The preparation of upwards of forty pharmaceutical salts included in this course. ROGERS, NETZ.
- 13f. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS. A preparation for Pharmacy 15-16. WULLING, ROGERS.
- 15f, w, s. PHARMACEUTICAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS. Includes the critical study of cellulose and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc. ROGERS.
- 17f. PHARMACOPOEIAL QUALITATIVE ANALYSIS. A critical study of the identity, purity, limit, and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. BACHMAN, TURNER.

- 18w. PHARMACOPOEIAL QUANTITATIVE ANALYSIS. This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay (12w). BACHMAN, TURNER.
- 19f, w, s. PRESCRIPTION INCOMPATIBILITY. Therapeutic, pharmaceutical, and chemical incompatibility is taken up in lecture and recitation work preliminary to Course 21. BACHMAN.
- 21f, w, s. PRESCRIPTION DISPENSING. This course runs concurrently and in coöperation with Dispensary Prescription Practice 1f,w,s, and includes the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. BACHMAN, BLOSMO, TURNER.
- 10w. NATIONAL FORMULARY. This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. BACHMAN, TURNER.
- 12w. PHARMACEUTICAL ASSAY. The quantitative determination of alkaloidal and other active constituents of a number of the potent U. S. P. organic drugs and preparations. BACHMAN, TURNER.
- 14s. SYNTHETIC REMEDIES. The study of the pharmaceutical chemistry of synthetic chemicals in medical use. ROGERS.
- 16w. HOMEOPATHIC PHARMACY. A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. WULLING, BACHMAN.
- 25w, s. IDENTIFICATION OF U. S. P. SALTS. The study of the physical identity of the more important official inorganic and organic salts. BACHMAN, TURNER.
- 20s. MICROCHEMISTRY. Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. NEWCOMB, ROGERS.
27. MATHEMATICS OF PHARMACY. While students are required to have a preparation in arithmetic, algebra, and geometry before entering, they receive frequent drills throughout the year. Examinations in the subject are required. WULLING, BACHMAN, ROGERS, BLOSMO.
- 29f, w, s. DRUG AND FOOD ANALYSIS. A course designed to prepare students for commercial pharmaceutical analytical work. ROGERS, NETZ.

PHARMACEUTICAL AND BUSINESS LAW

Professor FREDERICK J. WULLING.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Ethics and Law for Pharmacists.....	2	Sr.	None
2s	Minnesota Pharmacy Laws.....	1/3	Sr.	None

- 1s. LAW FOR PHARMACISTS. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy, and discuss the liability of retail pharmacists. WULLING.
- 2s. MINNESOTA PHARMACY LAWS. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Professor FRANK F. GROUT, and Assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Mineralogy	1	Sr., grad.	None
2s	Crystallography	1	Sr., grad.	1s

- 1s. MINERALOGY. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relation. GROUT and Assistant.
- 2s. CRYSTALLOGRAPHY. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. GROUT.

PHARMACOGNOSY

Professor EDWIN L. NEWCOMB and Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Medicinal Plant Study.....	1	Fr.	None
2w	The Thallophytes, Archegoniates, and Gymnosperms.....	2	Fr.	1
3s	Pharmaco-Histology	3	Fr.	2w, Mat. Med. 1f, w, s
4f	Drug Collection.....	3	Jr.	3s
5w	The Angiosperms.....	10	Jr.	3s
6s	Field Work.....	2	Jr.	1s
7w	Physiological Drug Assay.....	3	Sr.	5w
8w,s	Advanced Pharmacognosy.....	3	Sr.	5w

- 1s. MEDICINAL PLANT STUDY AND DRUG PREPARATIONS. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. NEWCOMB and Assistants.

- 2W. THE PHARMACOGNOSY OF THE THALLOPHYTES, ARCHEGONIATES, AND GYMNASPERMS. In this course some of the drugs and economic products obtained from the thallophytes, archegoniates, and gymnosperms are studied. NEWCOMB and Assistants.
- 3S. PHARMACO-HISTOLOGY. Includes the micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by about forty official and unofficial drugs. NEWCOMB and Assistant.
- 4F. DRUG COLLECTION AND PREPARATION. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. NEWCOMB and Assistants.
- 5W. PHARMACOGNOSY OF THE ANGIOSPERMS. Includes the scientific study of the official crude and powdered seeds, roots, rhizomes, barks, woods, pith, flowers, fruits, leaves, herbs, exudations, animal drugs, etc., and their adulteration. NEWCOMB and Assistants.
- 6S. FIELD WORK. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. NEWCOMB.
- 7W. PHYSIOLOGICAL DRUG ASSAY. Optional. The pharmacopoeial and the more important unofficial methods of biologic assay of drugs and their preparations are studied. NEWCOMB.
- 8W, S. ADVANCED PHARMACOGNOSY. Designed to give students a working knowledge of the use of the more important microscopical accessories in advanced pharmacognostic work. NEWCOMB.

PHYSICAL EDUCATION FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructors EDWIN S. BROWN, PERCY C. GLIDDEN, CARL B. ROEMER.

The purpose of the department is to provide all men of the University opportunities for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming-pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a

course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f	Personal Hygiene.....	None	All	None

1f. PERSONAL HYGIENE. Two hours per week; first six weeks of first quarter. Examination at close of course. COOKE.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn quarter, with required attendance on the part of all freshmen.

PHYSICAL EDUCATION

FOR WOMEN

Professor J. ANNA NORRIS; Assistant Professor MAY S. KISSOCK*; Instructors GERTRUDE M. BAKER,* VALERIA G. LADD, GERTRUDE B. SCHILL, ALICE H. TOLG.

This department aims to promote the health of the women students. It gives physical examination and advice to all on entrance; plans systematically to keep in close touch with them during their first year in college; conducts yearly consultations with, and examines when necessary, all upper-class students; gives courses in hygiene; organizes physical work to meet the varying needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department is required of all newly entering students (see Courses 1,2,3,11f), of sophomores who can not pass the swimming examination, and of all students permitted, for reasons connected with their physical condition, to carry less than the minimum number of credit hours. Physical examinations or consultations required annually of all students.

Elective classes arranged in gymnastics, dancing, swimming, fencing, field-hockey, basket-ball, baseball, and other activities.

For requirements for a teacher's certificate, see bulletin of the College of Education.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f-2w-3s	Elementary Physical Training...	None	Required of all new students	None
11f	Preliminary Hygiene.....	None	All new students	None

* On leave of absence, 1920-21.

1f-2w-3s. ELEMENTARY PHYSICAL TRAINING. Lighter forms of gymnastics; gymnastic dances; indoor and outdoor games. Study of daily habits of living. Shower bath fee, \$2.50 per quarter. KISSOCK, LADD, SCHILL, TOLG.

11f. PRELIMINARY HYGIENE. One lecture a week. The most essential aspects of the care of the body. NORRIS.

PHYSIOLOGY

Professors ELIAS P. LYON, FREDERICK H. SCOTT; Associate Professors RICHARD OLDING BEARD, JESSE F. MCCLENDON; Assistant Professors FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE; Instructors CHARLES C. GAULT, ESTHER GREISHEIMER; Teaching Fellow.....

COURSES

3f, w, su. HUMAN PHYSIOLOGY. Science, Literature, and the Arts, School for Nurses, Home Economics, and other students. Prerequisites: elementary biology and chemistry. Lectures and laboratory. 5 qtr. cr. LYON, BEARD, GREISHEIMER.

4f, w, su. Same as Course 3 without laboratory. Pharmacy students.

6s, su. PHYSIOLOGIC CHEMISTRY. Dental students and others. Prerequisite: organic chemistry. 3 qtr. cr. PETTIBONE, and Assistants.

THERAPEUTICS AND TOXICOLOGY

Associate Professor EDGAR D. BROWN.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Therapeutics and Toxicology.....	3	Jr.	Pharmacognosy 5w & Mat. Med. 1f, w, 2w, s

1s. THERAPEUTICS AND TOXICOLOGY. Drugs are studied in groups as governed by their medicinal and toxic properties. Remedial measures other than those depending upon drugs are fully considered. Poisonous action and doses of drugs also receive consideration. BROWN.

STUDENTS

1919-1920

REGULAR COURSE

First Year

Barry, Arthur L., Grey Eagle, Minn.	Lenz, Otto, Conde, S. D.
Bratberg, Edward N., Minneapolis	Lenz, Joseph R., Conde, S. D.
Carrington, Marion A., Rockford, Ill.	Leiby, Edwin M., Ellendale, N. D.
Conger, Newton, Ogilvie, Minn.	Nelson, Chester L., Willmar
De Witz, Bryan E., Rochester	Nelson, Otto J., Waubay, S. D.
Dolan, James D., Fulda	Nestande, Spencer, Minneapolis
Elfenbein, Harold, St. Paul	O'Connor, John, Minneota
Falk, Herman C., St. Paul	Parsons, Edwin M., St. Paul
Fischer, Edwin G., Lewiston	Peterson, Argyll W., Battle Lake
Fortier, Charles A., Little Falls	Quanrud, Maurice A., Lanesboro
Gaetke, Armin H., New Ulm	Rask, William O., Minneapolis
Gandrud, Arnold, Kerkhoven	Rosenberg, Harry, St. Paul
Hannaford, Demming, Virginia	Rud, George M., Kenyon
Hansen, Walter L., Le Sueur	Sands, Aaron N., Kenyon
Hanson, Victor A., Minneapolis	Sater, Edwin S., Madison
Hodel, Earl M., Minneapolis	Schrupp, G. Wesley, Henderson
Hollenitsch, William J., Waseca	Severance, Mark L., Minneapolis
Holtz, Harvey, Waseca	Shellenberger, Alfred, Minneapolis
Ilitis, Russell R., International Falls	Shilonsky, Philip, Russia
Johnson, Joseph, Owatonna	Silvernale, John A., Marietta
Keating, Frances J., Kewanee, Ill.	Stephens, James L., St. Paul
King, Etha P., St. Lawrence, S. D.	Schwartz, R. L.
Koefod, Margaret, Granite Falls	Swann, George W., Madison
Klause, Norma, New Ulm	Tapager, Martha M., Albert Lea
Kronick, Benjamin D., Minneapolis	Tmey, Amas, Hutchinson
Kraker, Jule H., Albany	Vieth, Myron, Minneapolis
Wentzel, Roy, Minneapolis	

Second Year

Abbotts, T. Harold, Caledonia	Nelson, Edwin F., Milaca
Blair, John H., Herreid, S. D.	Nelson, Gustave N., DeSmet, S. D.
Bryan, Verle S., Minneapolis	Nichols, Josephine, Mazeppa
Carlson, Blenda, Minneapolis	Nordstrom, Evelyn, Sacred Heart
Dargavel, Warren C., Morristown	Roberts, James, Minneapolis
Ford, George, Brainerd	Ross, Ione, Ortonville
Gale, R. Glyde, Minneapolis	Smetana, Harold, Hopkins
Geib, Irene E., Minneapolis	Swanson, Ernest G., Hopkins
Hawlish, Henry J., Hopkins	Walechka, Louis, Owatonna
Johnson, Ruby, Wayzata	Webster, Walter, Rushford
Jones, Victor, Clark, S. D.	Winzenburg, Charles, Granada

Third Year

Aldes, Antoinette, St. Paul	Dargavel, James B., Morristown
Amberg, Ray M., Minneapolis	Goldner, Sigurd, Minneapolis
Baines, Wiley C., Minneapolis	Guilbert, Oliver, Henderson
Blanchette, John J., Anoka	Hovland, Guy B., Dawson
Chambers, Charles M., Minneapolis	Kingman, Gerhart I., E. Grand Forks
Choudek, Beatrice B., Seaforth	Langland, Bert
Cohler, Sara B., St. Paul	Layne, George E., Rushford

Malerich, Elizabeth M., Little Falls	Spetz, Esther, Bismarck, N. D.
Netz, Charles V., Owatonna	Siperstein, Anne E., Minneapolis
Petterson, Clarence N., Battle Lake	Thibodeau, Leonard L., Faribault
Schieser, Elizabeth, Miles City, Mont.	Townsend, Royal E., Ivanhoe
White, Rush M., Buffalo	

FOUR-YEAR COURSE

First Year

Hanlon, John L., Northfield	Reid, Melvin L., Red Wing
Humphrey, Alla Mae, Anoka	Segal, Fannie, Minneapolis
Kruckeberg, Louise, Minneapolis	Wilson, Donald, Forsyth, Mont.

Second Year

Haywood, H. Parker, Osakis	Lark, George, Minneapolis
Taylor, Angus, Owatonna	

Third Year

Abrahamson, Myrtle, Red Lodge, Mont.	Nisbett, Beulah, Grand Rapids
Jones, Ruth, Clark, S. D.	Sanderson, Mildred, Stephen

Fourth Year

Boothroyd, Margaret, Minneapolis	Vogel, Vivian V., Minneapolis
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1921/22

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UNIVERSITY OF ILLINOIS

The Bulletin of the University of Minnesota

*The College of Pharmacy
Announcement for the Year
1921-1922*



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UNIVERSITY CALENDAR

1921-1922

1921

September	17	Saturday	Payment of fees closes, except for new students
September	20-27	Week	Examinations for removal of conditions and entrance examinations Physical examinations for all new students
September	19-24	Week	Registration period, Colleges of Science, Literature, and the Arts, and Agriculture, Forestry, and Home Economics
September	26	Monday	First semester evening extension classes begin
September	26-27		Registration days for all colleges not indicated above
September	27	Tuesday	Payment of fees for new students closes
September	28	Wednesday	Fall quarter begins, 8:30 a.m.
October	15	Saturday	Class Scrap Day; all classes dismissed the fourth hour
October	20	Thursday	Senate meeting, 4:30 p.m.
November	5	Saturday	Home Coming Day; classes dismissed - the third and fourth hours
November	11	Friday	Armistice Day; a holiday
November	24	Thursday	Thanksgiving Day; a holiday
December	15	Thursday	Senate meeting, 4:30 p.m.
December	21	Wednesday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.

1922

January	4	Wednesday	Christmas vacation ends, winter quarter begins, 8:30 a.m.
January	20	Friday	First semester evening extension classes close
January	30	Monday	Second semester evening extension classes begin
February	16	Thursday	Senate meeting, 4:30 p.m.
February	22	Wednesday	Washington's Birthday; a holiday
March	23	Thursday	Winter quarter ends, spring vacation begins, 5:20 p.m.
March	29	Wednesday	Spring vacation ends, spring quarter begins, 8:30 a.m.
May	18	Thursday	Senate meeting, 4:30 p.m.
May	19	Friday	Second semester evening extension classes close
May	30	Tuesday	Memorial Day; a holiday
June	11	Sunday	Baccalaureate service
June	13	Tuesday	Spring quarter closes, 5:20 p.m.
June	14	Wednesday	Fiftieth annual commencement
June	17-19		Registration days for summer session
June	20	Tuesday	Summer session begins
July	28	Friday	Summer session closes

THE COLLEGE OF PHARMACY

FACULTY

- LOTUS DELTA COFFMAN, Ph.D., President
WILLIAM WATTS FOLWELL, LL.D., President Emeritus
CYRUS NORTHROP, LL.D., President Emeritus
FREDERICK J. WULLING, Phm.G., Phm.D., LL.M., Dean, Professor of Pharmacology, and Director of the University Medicinal Plant Gardens
GUSTAV BACHMAN, Phm.D., M.Phm., Professor of Pharmacy
RICHARD OLDING BEARD, M.D., Associate Professor of Physiology
EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology
FREDERIC K. BUTTERS, B.S., B.A., Associate Professor of Botany
LOUIS J. COOKE, M.D., Director of Physical Education for Men
WILLIAM S. COOPER, Ph.D., Assistant Professor of Botany
ELIAS J. DURAND, B.A., D.Sc., Professor of Botany
BEN W. FEILD, Major, Infantry, Assistant Professor of Military Science and Tactics
WILLIAM K. FOSTER, LL.M., Assistant Director of Physical Education for Men
FRANK F. GROUT, M.S., Ph.D., Professor of Geology and Mineralogy
ARTHUR T. HENRICI, M.D., Associate Professor of Pathology and Bacteriology
NED L. HUFF, M.A., Assistant Professor of Botany
WILLIAM H. HUNTER, Ph.D., Professor of Chemistry
FRANCIS B. KINGSBURY, Ph.D., Assistant Professor of Physiologic Chemistry
MAY S. KISSOCK, B.A., Assistant Professor of Physical Education for Women
LEE I. KNIGHT, Ph.D., Professor of Botany
WINFORD P. LARSON, M.D., Professor of Bacteriology
ORA M. LELAND, B.S., C.E., Professor of Chemistry
ELIAS P. LYON, Ph.D., M.D., Professor of Physiology
JESSE F. MCCLENDON, Ph.D., Associate Professor of Physiology
EDGAR B. MOOMAU, First Lieutenant, Infantry; Assistant Professor of Military Science and Tactics
EDWIN L. NEWCOMB, Phm.D., Professor of Pharmaceutical Botany and Pharmacognosy
J. ANNA NORRIS, M.D., Professor of Physical Education for Women
CHAUNCEY J. V. PETTIBONE, Ph.D., Associate Professor of Physiologic Chemistry
CHARLES H. ROGERS, B.Sc., M.Phm., D.Sc. in Phm., Associate Professor of Pharmaceutical Chemistry and Pharmacy
CARL O. ROSENDAHL, Ph.D., Professor of Botany
HAL M. ROSE, First Lieutenant, Cavalry; Assistant Professor of Military Science and Tactics
FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Professor of Physiology

- CHARLES F. SIDENER, B.S., Professor of Chemistry
M. CANNON SNEED, Ph.D., Associate Professor of Chemistry
GIRARD STURTEVANT, Colonel, Infantry; Professor of Military Science and Tactics
JOSEPHINE E. TILDEN, M.S., Professor of Botany
CHARLES N. MCCLOUD, Phm.D., M.D., Lecturer on First Aids to the Injured
GERTRUDE M. BAKER, Instructor in Swimming
HELEN A. BARR, B.A., Instructor in Physical Education
ANNE BENTON, M.A., Instructor in Bacteriology
EDWIN S. BROWN, M.D., Instructor in Physical Education for Men
HALLIE F. E. BRUCE, Phm.G., Instructor in Dispensing
GLADYS A. FELLOWS, B.A., Instructor in Physical Education for Women
CHARLES C. GAULT, B.A., Instructor in Physiology
PERCY C. GLIDDEN, Instructor in Swimming
ESTHER GREISHEIMER, B.S. in E., Ph.D., Instructor in Physiology
ARTHUR M. JOHNSON, Ph.D., Instructor in Botany
VALERIA G. LADD, B.A., Instructor in Physical Education for Women
WALTER M. LAUER, B.A., M.S., Instructor in Chemistry
GERTRUDE K. LYON, B.A., Instructor in Physical Education for Women
LLOYD H. REYERSON, Ph.D., Instructor in Chemistry
GRACE M. ROCKWOOD, B.A., Instructor in Physical Education for Women
CARL B. ROEMER, Instructor in Physical Education for Men
GERTRUDE B. SCHILL, B.A., Instructor in Physical Education for Women
LEE I. SMITH, Ph.D., Instructor in Chemistry
DAVID O. SPRIESTERSBACH, M.S., Instructor in Bacteriology
ALICE H. TOLG, M.D., Instructor in Physical Education for Women
DEL D. TURNER, Ph.C., Laboratory Instructor in Pharmacy
VERLE S. BRYAN, Assistant in Pharmacy Laboratory
CHARLES W. FOLKESTAD, Phm.G., Assistant in Pharmacy
ROBERT G. GREEN, M.A., Assistant in Bacteriology
CHARLES V. NETZ, Phm.C., Assistant in Pharmacy
CHARLES E. SMYTHE, Assistant in Pharmacognosy and Departmental Librarian
HATTIE E. SPAHR, B.A., Teaching Fellow in Physiology
VIVIAN VOGEL, Phm.C., Assistant in Dispensing

GENERAL INFORMATION

The twenty-ninth annual course of the College of Pharmacy begins and ends as announced in the calendar on preceding pages.

ENTRANCE REQUIREMENTS

ADMISSION BY CERTIFICATE

Diplomas, certificates, or other evidences of the completion of an accredited four-year high-school course, or of its educational equivalent, are required for admission. The high-school course must have included:

- | | |
|--|---------|
| 1. English | 4 units |
| or English..... | 3 units |
| and a foreign language..... | 2 units |
| 2. Mathematics | |
| Elementary algebra | 1 unit |
| Plane geometry | 1 unit |
| 3. Latin | 1 unit |
| 4. Enough additional work to make in all 15 units, of which not more than 4 may be in Group F. | |

Prospective students in pharmacy are urged to secure high-school preparation in physics, chemistry, botany, and physiology.

Group F consists of high-school vocational and miscellaneous subjects. Not more than 4 units and studies in this group may be counted toward admission. The subjects are no longer designated by the University. The applicant is free to present in this division such studies as are not listed in other groups, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

The freshman class is limited to sixty students.

ADMISSION BY EXAMINATION

Students may take examinations in subjects for which they have no certificates. A high-school training covers a minimum of 15 units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations in respective high-school subjects.

NEW STUDENTS

All applicants for admission should request their high-school principals or superintendents to send a complete transcript of their records to the registrar of the University as early as possible and not later than September 1. Upon receipt of the credentials, the registrar will notify the applicant concerning his admission and will forward directions for registration. (See calendar for registration dates.)

New students are admitted only at the beginning of the fall quarter.

OLD STUDENTS

About September 1, the registrar will send a fee statement to your home address as it appears on the records of this office. Those who fail to receive this before September 7 should write to the registrar and ask for it. (See calendar for dates of registration and payment of fees.)

FEES AND OTHER EXPENSES

The quarterly tuition fee of \$30 for resident students and \$40 for non-resident students includes all laboratory fees, except chemistry and is payable at the beginning of each quarter. Certificates entitling the student to admission to classes will not be issued until fees have been paid.

Tuition fee (per quarter)

Residents of Minnesota.....	\$30.00
Non-residents	40.00
Deposit (first quarter only).....	10.00
Military deposit (required of all students taking military drill).....	10.00
Health fee (per quarter).....	2.00
Minnesota Union or Shevlin Hall (per quarter).....	1.00
Post-office box (per quarter).....	.20

Special fees:

Examinations for removal of condition.....	1.00
Examinations for credits (after the first six weeks in residence).....	5.00
Special examinations	5.00
Chemistry deposit.....	5.00

PENALTY FEES:

Registration penalties.—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2.00) and one dollar (\$1.00) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12.00) of penalty in any given quarter.

Those desiring to take special work may pay fees on a clock-hour basis, the rate being \$1.25 an hour for resident students and \$1.75 an hour for non-resident students.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course for which they have matriculated.

Every person upon whom any degree is conferred must be of good moral character and at least twenty-one years old; must have completed the required three years of lecture and laboratory courses, the last at this college; and must have passed examinations in the subjects required for graduation.

Drug-store experience is not a requirement for graduation.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Academically qualified persons desiring to do less than the work of the regular course may be admitted as unclassified or special students provided there is laboratory room for them. They will not be rated in their work or examined unless they make special request therefor. Work completed satisfactorily will be credited should the students subsequently enter the regular course, provided they meet the full entrance requirements. Registered pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

EXAMINATIONS AND STANDINGS

Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (conditioned), I (incomplete), and F (failure). Conditions may be removed as indicated below. An *incomplete* not removed before the end of the first month of the student's next quarter in college becomes a *condition*. The Students' Work Committee may, in special cases, extend this time limit.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses, which must be taken in full.

Students having conditions in more than two major or in more than three minor subjects of the first year can not enter upon the second year's work. Candidates for graduation must have removed all conditions before entering upon the third quarter of the graduating year.

Examinations for the removal of conditions will be offered the week preceding the opening of the fall quarter. Similar examinations will also be given by certain of the colleges not earlier than the seventh week or later than two weeks preceding the final examination periods of the winter and spring quarters. Announcement of these examinations will appear in the general information bulletin and the *Official Daily Bulletin*. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absences will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this college, subject to the approval of the dean. Opportunity is afforded to do advanced work in all branches. Textbooks may be obtained after coming to the University.

Students find their time fully occupied.

MEDICINAL PLANT LABORATORY AND GARDEN

Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the educational facilities of the college. The college has no experience or information concerning the commercial cultivation of medicinal plants.

DISPENSARY PRESCRIPTION PRACTICE

The seniors, under competent direction and supervision, dispense the prescriptions written by the physicians in the Out-Patient Department of the University Hospitals. During the past year upwards of twenty-five thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

ELECTIVES IN OTHER UNIVERSITY COLLEGES

Students may elect certain subjects in other university colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the dean.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In many states, including Minnesota, such training is now obligatory by law. In a number of other states credit is given for college work. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug-store experience before they become eligible for examination for full registration.

SCHOLARSHIPS

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP

The Minnesota State Pharmaceutical Association awards annually \$90 to that student who is a citizen of the United States, who has resided in Minnesota for at least five years, and who has earned the highest general rating in the work of the second year of the regular course in this college. If such student should discontinue attendance at the college, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

THE FAIRCHILD SCHOLARSHIP

Mr. Samuel W. Fairchild offers a scholarship in the sum of \$300 to be awarded to that student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who has had two years of drug-store experience, is a high-school graduate, who has completed one year in a recognized college of pharmacy, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy. Fuller particulars may be had from the dean of the college.

POSITIONS FOR GRADUATES

The demand for graduates of this college has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This college is recognized in all states, including those in which state standards of efficiency have been established.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the college four times each year to examine candidates for registration. For information concerning the board or state examinations, address the secretary of the board, Mr. H. Martin Johnson, Fourth and St. Peter Streets, St. Paul, Minnesota.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

This college is a member of the American Conference of Pharmaceutical Faculties, whose object is the promotion of higher pharmaceutical education. Through the influence of the conference, higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the conference. Member-colleges must maintain certain minimum entrance and graduation requirements. This college exceeds these requirements.

THE NORTHWESTERN BRANCH OF THE AMERICAN
PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

COMMUNICATIONS

Address communications not relating to registration to the dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota.

For further information see general information bulletin.

COURSES OF STUDY

Four graded courses leading respectively to the degrees Pharmaceutical Chemist, Bachelor of Science in Pharmacy, Master of Science in Pharmacy, and Doctor of Science in Pharmacy, are authorized by the regents. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded, and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six years.

THE PRESENT REGULAR COURSE

This course extends over a period of three full university years. The lengthening of the regular course from two to three years has been approved by the Minnesota State Pharmaceutical Association and by the Minnesota State Board of Pharmacy. The curriculum of this course is described in the following pages, but its division among the three years may be changed as experience may warrant.

OUTLINE OF THE REGULAR THREE-YEAR COURSE

(Subject to change)

FRESHMAN

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Botany	Botany	Botany
General Chemistry	General Chemistry	General Chemistry
Military training	Military training	Military training
Pharmacy	Pharmacy	Pharmacy
Pharmac. Chemistry,	Pharmac. Chemistry,	Pharmac. Chemistry,
Didactic	Didactic	Didactic
Pharmacognosy	Pharmacognosy	Pharmacognosy

JUNIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Materia Medica	Materia Medica	Materia Medica
Qualitative Chemistry	Organic Chemistry	Organic Chemistry
Pharmacognosy	Pharmacognosy	Pharmacognosy
Pharmac. Chemistry,	Pharmac. Chemistry,	U. S. P. Testing
Practical	Practical	Therapeutics
Military training	U. S. P. Testing	Operative Pharmacy
	Military training	Military training

SENIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Dispensing	Dispensing	Dispensing
U. S. P. Assay	U. S. P. Assay	U. S. P. Assay
Bacteriology	Drug and Food Analysis	Mineralogy and Crystallog.
Drug and Food Analysis	Physiology	Drug and Food Analysis
Dispensary Practice	Dispensary Practice	Law and Ethics
Organic Pharmacy		Dispensary Practice

THE FOUR-YEAR COURSE

The four-year course includes all of the regular three-year course and in addition rhetoric, 9 credits; any modern language, 9 credits; physics, 9 credits; and electives sufficient to total at least 18 additional credits. Students who have completed this academic or pre-pharmacy work in the College of Science, Literature, and the Arts, or in a college of corresponding standing, are eligible for entrance upon the second year of this course. The degree for this course can not be granted except for four years of work in residence, of which at least the fourth year must be taken in residence at this college.

CREDIT VALUE

The credit values of courses were changed September, 1918. Now a credit value covers one period of lecture or recitation or two periods of laboratory work per week per quarter. The numbers expressing the credit value of courses are now fifty per cent greater than formerly.

DEPARTMENTAL STATEMENTS

BACTERIOLOGY AND IMMUNOLOGY

Professor WINFORD P. LARSON; Associate Professor ARTHUR T. HENRICI;
Instructors ANNE BENTON, DAVID O. SPRIESTERSBACH; Assistant
ROBERT G. GREEN.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f,w,s,su	Elementary Bacteriology.....	5	Sr.	None
For additional courses see the bulletin of the Medical School.				

1f,w,s,su. ELEMENTARY BACTERIOLOGY. Lecture and laboratory course. The principles and technic of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. DR. LARSON, MISS BENTON, MR. GREEN.

BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule one two-hour period a week for this kind of work during the second quarter of the graduating year. A room has been reserved for this purpose in the Pharmacy Building. To make this work of the utmost value the pharmaceutical library is being enlarged.

BOTANY

Professors C. OTTO ROSENDAHL, ELIAS J. DURAND, LEE I. KNIGHT, JOSEPHINE E. TILDEN; Associate Professor FREDERIC K. BUTTERS; Assistant Professors WILLIAM S. COOPER, RODNEY B. HARVEY, NED L. HUFF; Instructors CHARLES L. FARABAUGH, ARTHUR M. JOHNSON; Assistants.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
17f-18w-19s	General Botany.....Total	9	Fr.	None

17f-18w-19s. GENERAL BOTANY AND GREENHOUSE WORK. Study of external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outline of classification of flowering plants. Lectures, laboratory work, field work. MR. BUTTERS.

CHEMISTRY

Professor WILLIAM H. HUNTER; Associate Professor M. CANNON SNEED;
Instructors WALTER M. LAUER, LLOYD H. REYERSON, LEE I. SMITH.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f,2w,3s	Gen. Inorganic Chemistry.....	4	Fr.	None
11f	Qualitative Analysis.....	4	Soph.	1, 2, 3
31f-32w	Elementary Org. Chemistry...	4	Soph.	1-2-3

- 1f. GENERAL INORGANIC CHEMISTRY. A study of the general laws of chemistry and of the non-metals and their compounds. MR. REYERSON.
- 2w. GENERAL INORGANIC CHEMISTRY. A continuation of Course 1. MR. REYERSON.
- 3s. GENERAL INORGANIC CHEMISTRY. A study of the metals and their compounds. A continuation of Course 2. MR. REYERSON.
- 11f. QUALITATIVE CHEMICAL ANALYSIS. Laboratory work in systematic qualitative analysis with lectures on solution, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. For students who satisfy the requirements of general chemistry. MR. REYERSON.
- 31f-32w. ELEMENTARY ORGANIC CHEMISTRY. A discussion of the important classes of organic compounds, both aliphatic and aromatic. The laboratory work includes the preparation of typical substances. Primarily for dental and pharmacy students. MR. LAUER.

CLINICAL MICROSCOPY

Professor.....; Instructor.....

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Clinical Chemistry and Microscopy .....Total	1	Sr.	None
1s.	CLINICAL CHEMISTRY AND MICROSCOPY. Includes (a) the microscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc. Optional.			

DISPENSARY PRESCRIPTION PRACTICE

Instructor HALLIE BRUCE; Assistant VIVIAN VOGEL.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f,w,s	Prescription Practice.....Total	2½	Sr.	Pharm. 5

If, w, s. DISPENSARY PRESCRIPTION PRACTICE. The prescription dispensing for the Out-Patient Department of the University Hospitals is in charge of the College of Pharmacy. The senior students do the prescription work under competent direction. MISS BRUCE, MISS VOGEL.

FIRST AIDS TO THE INJURED

Lecturer CHARLES N. MCCLOUD and Assistant.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Emergency Cases.....Total	1	Fr.	None

1s. EMERGENCY CASES. A series of lectures and demonstrations designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician. DR. MCCLOUD.

MATERIA MEDICA

Professors FREDERICK J. WULLING, EDWIN L. NEWCOMB, and Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f, w, s	Inorganic Materia Medica.....	1	Fr.	None
2w, s	Organic Materia Medica.....	6	Fr., jr.	1

1f, w, s. INORGANIC MATERIA MEDICA. This course runs concurrently and in close relationship with Pharmacy 8 and 11, and includes chiefly the medical properties and doses of inorganic official bodies. MR. WULLING and Assistants.

2w, s. ORGANIC MATERIA MEDICA. The identity, sources, habitat, family constituents, and preparations of the U. S. P., and of some unofficial vegetable drugs are studied in this course. MR. NEWCOMB and Assistants.

MILITARY SCIENCE AND TACTICS

Professor GIRARD STURTEVANT, Colonel, Infantry, Chairman; Assistant Professors BEN W. FEILD, Major, Infantry; EDGAR B. MOOMAU, 1st Lieutenant, Infantry; HAL M. ROSE, 1st Lieutenant, Cavalry.

No.	Title	Hrs.	Required of	Prerequisite courses
1	First-Year Basic Course R.O.T.C...	3	† All fr.	None
2a	Second-Year Basic Course R.O.T.C., Infantry	3	Soph.	1
2b	Second-Year Basic Course R.O.T.C., Coast Artillery.....	3	Soph.	1
2c	Second-Year Basic Course R.O.T.C., Signal Corps.....	3	Soph.	1
51-52-53	First-Year Advanced Course R.O.T.C. (Infantry, Signal Corps, or Coast Artillery)...	5	* Elective	1, 2
54-55-56	Second-Year Advanced Course R.O.T.C. (Infantry, Signal Corps, or Coast Artillery)...	5	Elective *	51-52-53

† Must be legally eligible for enrolment in Reserve Officers' Training Corps.

* Must have satisfactorily completed Basic Course R.O.T.C.

PHARMACY

Professors FREDERICK J. WULLING, GUSTAV BACHMAN; Associate Professor CHARLES H. ROGERS; Instructors HALLIE BRUCE, DEL D. TURNER; Assistants CHARLES W. FOLKESTAD, CHARLES V. NETZ, and Student Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f	History of Pharmacy.....	¾	Fr., jr.	None
3f	Metrology	4½	Fr., jr.	None
5w	Physics of Pharmacy.....	4½	Fr., jr.	3f
7w,s	Pharmaceutical Processes.....	5	Fr., jr.	5w
2w,s	Pharmacopoeial Preparations...	7½	Fr., jr.	7s
4f,w,s	Pharmacy Quiz.....	4½	Fr., jr.	3f, 5w, 7s, 2s
6w,s	Identification Inorganic U. S. P. Preparations	2	Fr., jr.	2s
9f	Pharmaceutical Chemical Philosophy	3	Fr., jr.	None
11w	Pharmaceutical Chemistry of the Non-Metals	3	Fr., jr.	9f
8s	U. S. P. Inorganic Salts.....	3	Fr., jr.	9f
13f	Classification of Pharmaceutical Organic Compounds.....	1½	Jr., sr.	8s
15f,w,s	Pharmaceutical Organic Compounds and Their Preparations	9	Jr., sr.	13f
17f	Pharmacopoeial Qualitative Anal.	7½	Jr., sr.	11w
18w	Pharmacopoeial Quant. Anal...	3	Jr., sr.	17f
19f,w,s	Prescription Incompatibility....	2	Jr., sr.	None
21f,w,s	Prescription Dispensing	18	Jr., sr.	None
8a f,w	Manufacture Pharmaceutical Inorganic Salts.....	6	Jr., sr.	8s
10w	National Formulary.....	1½	Jr., sr.	15, 8a, w
12w	Pharmaceutical Assay.....	2	Jr., sr.	10w
14s	Synthetic Remedies.....	1	Jr., sr.	15
16w	Homeopathic Pharmacy	1	Jr., sr.	21
25w,s	Identification U. S. P. Organic Salts	2	Jr., sr.	8s, 15
20s	Microchemistry .....	..	.....	.....
27	Mathematics of Pharmacy.....	1	Fr., jr.	3f
29f,w,s	Drug and Food Analysis.....	24	Sr.	.....

1f. HISTORY OF PHARMACY. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. MR. WULLING, MR. ROGERS.

3f. METROLOGY. A critical study of weights and measures and balances; specific gravity, specific volume; alligation, etc. MR. ROGERS, MR. NETZ.

5w. THE PHYSICS OF PHARMACY. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. MR. ROGERS, MR. NETZ.

7w s. PHARMACEUTICAL PROCESSES. A study of the various laboratory processes employed in pharmaceutical manufacture. MR. ROGERS, MR. NETZ.

- 2w,s. PHARMACOPOEIAL PREPARATIONS. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulae and processes. MR. ROGERS, MR. FOLKESTAD, MR. NETZ.
- 4f,w,s. PHARMACY QUIZ. A thoro review of the work covered in Courses 3f, 5w, 7s, and 2s. MR. ROGERS.
- 6w,s. IDENTIFICATION OF INORGANIC U. S. P. PREPARATIONS. The study of the appearance and physical properties of inorganic official preparations. MR. ROGERS, MR. NETZ.
- 9f. PHARMACEUTICAL CHEMICAL PHILOSOPHY. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. MR. WULLING.
- 11w. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS. A study of the description, properties, pharmacy, and manufacture of the non-metals used in pharmacy, including their U. S. P. preparations. MR. WULLING.
- 8s. U. S. P. INORGANIC SALTS. Especial reference to sources, description, properties, and manufacture. MR. WULLING.
- 3a,f,w. MANUFACTURE OF PHARMACEUTICAL INORGANIC SALTS. The preparation of upwards of forty pharmaceutical salts included in this course. MR. ROGERS, MR. FOLKESTAD, MR. NETZ.
- 13f. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS. A preparation for Pharmacy 15-16. MR. WULLING, MR. ROGERS.
- 15f,w,s. PHARMACEUTICAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS. Includes the critical study of cellulose and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc. MR. ROGERS.
- 17f. PHARMACOPOEIAL QUALITATIVE ANALYSIS. A critical study of the identity, purity, limit, and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. MR. BACHMAN, MR. TURNER.
- 18w. PHARMACOPOEIAL QUANTITATIVE ANALYSIS. This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay (12w). MR. BACHMAN, MR. TURNER.
- 19f,w,s. PRESCRIPTION INCOMPATIBILITY. Therapeutic, pharmaceutical, and chemical incompatibility is taken up in lecture and recitation work preliminary to Course 21. MR. BACHMAN.
- 21f,w,s. PRESCRIPTION DISPENSING. This course runs concurrently and in coöperation with Dispensary Prescription Practice 1f,w,s, and includes

the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. MR. BACHMAN, MISS BRUCE, MR. TURNER.

- 10w. NATIONAL FORMULARY. This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. MR. BACHMAN, MR. TURNER.
- 12w. PHARMACEUTICAL ASSAY. The quantitative determination of alkaloidal and other active constituents of a number of the potent U. S. P. organic drugs and preparations. MR. BACHMAN, MR. TURNER, MR. FOLKESTAD.
- 14s. SYNTHETIC REMEDIES. The study of the pharmaceutical chemistry of synthetic chemicals in medical use. MR. ROGERS.
- 16w. HOMEOPATHIC PHARMACY. A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. MR. WULLING, MR. BACHMAN.
- 25w,s. IDENTIFICATION OF U. S. P. SALTS. The study of the physical identity of the more important official inorganic and organic salts. MR. BACHMAN, MR. TURNER.
- 20s. MICROCHEMISTRY. Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. MR. NEWCOMB, MR. ROGERS.
27. MATHEMATICS OF PHARMACY. While students are required to have a preparation in arithmetic, algebra, and geometry before entering, they receive frequent drills throughout the year. Examinations in the subject are required. MR. WULLING, MR. BACHMAN, MR. ROGERS, MISS BRUCE.
- 29f,w,s. DRUG AND FOOD ANALYSIS. A course designed to prepare students for commercial pharmaceutical analytical work. MR. ROGERS, MR. NETZ.

PHARMACEUTICAL AND BUSINESS LAW

Professor FREDERICK J. WULLING.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Ethics and Law for Pharmacists....	2	Sr.	None
2s	Minnesota Pharmacy Laws.....	1/3	Sr.	None

- 1s. LAW FOR PHARMACISTS. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy, and discuss the liability of retail pharmacists. MR. WULLING.

- 2S. MINNESOTA PHARMACY LAWS. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Professor FRANK F. GROUT and Assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1S	Mineralogy	1	Sr., grad.	None
2S	Crystallography	1	Sr., grad.	1S

- 1S. MINERALOGY. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relation. MR. GROUT and Assistant.
- 2S. CRYSTALLOGRAPHY. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. MR. GROUT.

PHARMACOGNOSY

Professor EDWIN L. NEWCOMB; Assistant CHARLES E. SMYTHE and Student Assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1S	Medicinal Plant Study.....	1	Fr.	None
2W	The Thallophytes and Archegoni- ates	2	Fr.	1
3S	Pharmaco-Histology	3	Fr.	2W, Mat. Med. 1f, w, s
4f	Drug Collection	3	Jr.	3S
5W	The Angiosperms.....	10	Jr.	3S
6S	Field Work.....	2	Jr.	1S
7W	Physiological Drug Assay.....	3	Sr.	5W
8W, S	Advanced Pharmacognosy.....	3	Sr.	5W

- 1S. MEDICINAL PLANT STUDY AND DRUG PREPARATIONS. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. MR. NEWCOMB and Assistants.
- 2W. THE PHARMACOGNOSY OF THE THALLOPHYTES AND ARCHEGONIATES. In this course some of the drugs and economic products obtained from the thallophytes and archegoniates are studied. MR. NEWCOMB and Assistants.
- 3S. PHARMACO-HISTOLOGY. Includes the micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by about forty official and unofficial drugs. MR. NEWCOMB and Assistants.

- 4f. DRUG COLLECTION AND PREPARATION. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. MR. NEWCOMB and Assistants.
- 5w. PHARMACOGNOSY OF THE ANGIOSPERMS. Includes the scientific study of the official crude and powdered seeds, roots, rhizomes, barks, woods, pith, flowers, fruits, leaves, herbs, exudations, animal drugs, etc., and their adulteration. MR. NEWCOMB and Assistants.
- 6s. FIELD WORK. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. MR. NEWCOMB.
- 7w. PHYSIOLOGICAL DRUG ASSAY. Optional. The pharmacopoeial and the more important unofficial methods of biologic assay of drugs and their preparations are studied. MR. NEWCOMB.
- 8w,s. ADVANCED PHARMACOGNOSY. Designed to give students a working knowledge of the use of the more important microscopical accessories in advanced pharmacognostic work. MR. NEWCOMB.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructors EDWIN S. BROWN, PERCY C. GLIDDEN, CARL B. ROEMER.

The purpose of the department is to provide all men of the University opportunities for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming-pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f	Personal Hygiene.....	None	All	None

- 1f. PERSONAL HYGIENE. Two hours per week; first six weeks of first quarter. Examination at close of course. DR. COOKE, DR. BROWN, MR. FOSTER.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn quarter, with required attendance on the part of all freshmen.

PHYSICAL EDUCATION

FOR WOMEN

Professor J. ANNA NORRIS; Assistant Professors MAY S. KISSOCK, VALERIA G. LADD, GERTRUDE B. SCHILL, ALICE H. TOLG; Instructors GERTRUDE M. BAKER, GLADYS A. FELLOWS, GRACE M. ROCKWOOD, GERTRUDE K. LYON.

This department aims to promote the health of the women students. It gives physical examinations and advice to all on entrance; plans systematically to keep in close touch with them during their first year in college; conducts yearly consultations with, and examines when necessary, all upper-class students; gives courses in hygiene; organizes physical work to meet the varying needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department is required of all newly entering students (see Courses 1,2,3,11f), of sophomores who can not pass the swimming examination, and of all students permitted, for reasons connected with their physical condition, to carry less than the minimum number of credit hours. Physical examinations or consultations required annually of all students.

Elective classes arranged in gymnastics, dancing, swimming, fencing, field-hockey, basket-ball, baseball, and other activities.

For requirements for a teacher's certificate, see bulletin of the College of Education.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f-2w-3s	Elementary Physical Training..	None	Required of all new students	None
11f	Preliminary Hygiene.....	None	All new students	None
1f-2w-3s.	ELEMENTARY PHYSICAL TRAINING. Lighter forms of gymnastics; gymnastic dances; indoor and outdoor games. Study of daily habits of living. Shower bath fee, \$2.50 per quarter. MISS KISSOCK, MISS LADD, DR. TOLG, MISS FELLOWS, MISS ROCKWOOD.			
11f.	PRELIMINARY HYGIENE. One lecture a week. The most essential aspects of the care of the body. DR. NORRIS.			

PHYSIOLOGY

Professors ELIAS P. LYON, FREDERICK H. SCOTT, JESSE F. MCCLENDON;
Associate Professors RICHARD OLDING BEARD, FRANCIS B. KINGSBURY,
CHAUNCEY J. V. PETTIBONE; Instructors CHARLES C. GAULT, ESTHER
GREISHEIMER; Teaching Fellow HATTIE E. SPAHR.

3f,w,su. HUMAN PHYSIOLOGY. Science, Literature, and the Arts, School
of Nursing, Home Economics, and other students. Prerequisites:
elementary biology and chemistry. Lectures and laboratory. 5 qtr. cr.
DR. LYON, DR. BEARD, MISS GREISHEIMER.

4f,w,su. Same as Course 3 without laboratory. Pharmacy students.

6s,su. PHYSIOLOGIC CHEMISTRY. Dental students and others. Prerequisite:
organic chemistry. 3 qtr. cr. MR. PETTIBONE and Assistants.

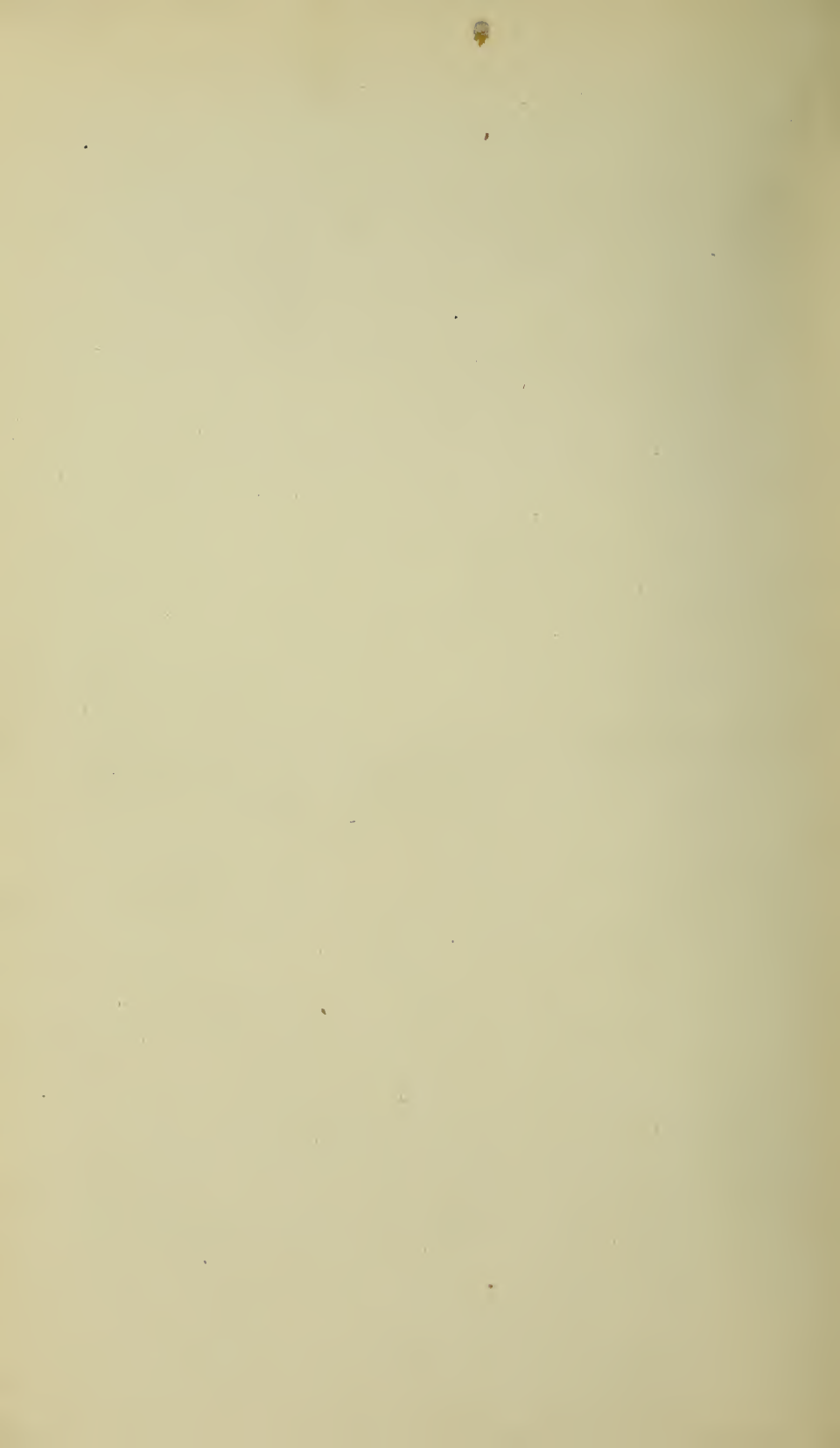
THERAPEUTICS AND TOXICOLOGY

Associate Professor EDGAR D. BROWN.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Therapeutics and Toxicology.....	3	Jr.	Pharmacognosy 5w, Mat. Med. 1f,w,2w,s

1s. THERAPEUTICS AND TOXICOLOGY. Drugs are studied in groups as gov-
erned by their medicinal and toxic properties. Remedial measures other
than those depending upon drugs are fully considered. Poisonous action
and doses of drugs also receive consideration. DR. BROWN.



The Bulletin of the University of Minnesota

*The College of Pharmacy
Announcement for the Year
1922-1923*



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[illegible]

UNIVERSITY CALENDAR

1922-23

1922

September	16	Saturday	Payment of fees closes, except for new students
September	19-26		Examinations for removal of conditions and entrance examinations Physical examinations for all new students
September	19-23		Registration period, colleges of Science, Literature, and the Arts, and Agriculture, Forestry, and Home Economics
September	25-26		Registration days for all colleges not indicated above
September	26	Tuesday	Payment of fees for new students closes
September	27	Wednesday	Fall quarter begins, 8:30* a.m.
October	14	Saturday	Class Scrap Day; classes dismissed the third and fourth hours
October	26	Thursday	Senate meeting, 4:30 p.m.
November	4	Saturday	Home Coming Day; classes dismissed the third and fourth hours
November	7	Tuesday	General Election Day; a holiday
November	11	Saturday	Armistice Day; a holiday
November	30	Thursday	Thanksgiving Day; a holiday
December	14	Thursday	Senate meeting, 4:30 p.m.
December	20	Wednesday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.

1923

January	4	Thursday	Christmas vacation ends, winter quarter begins, 8:30* a.m.
February	12	Monday	Lincoln's Birthday; a holiday
February	15	Thursday	Senate meeting, 4:30 p.m.
February	22	Thursday	Washington's Birthday; a holiday
March	23	Friday	Winter quarter ends, spring vacation begins, 5:20 p.m.
April	4	Wednesday	Spring vacation ends, spring quarter begins, 8:30* a.m.
May	17	Thursday	Senate meeting, 4:30 p.m.
May	30	Wednesday	Memorial Day; a holiday
June	17	Sunday	Baccalaureate service
June	20	Wednesday	Fifty-first annual commencement
June	20	Wednesday	Spring quarter closes, 5:20 p.m.
June	23-25		Registration days for Summer Session
June	26	Tuesday	Summer Session and summer quarter begin
July	4	Wednesday	Independence Day; a holiday
August	3	Friday	Summer Session closes
September	7	Friday	Summer quarter closes

* First hour classes begin at 8:15 at University Farm.

THE COLLEGE OF PHARMACY FACULTY

- LOTUS DELTA COFFMAN, Ph.D., President
WILLIAM WATTS FOLWELL, LL.D., President Emeritus
¹CYRUS NORTHROP, LL.D., President Emeritus
FREDERICK J. WULLING, Phm.G., Phm.D., LL.M., Dean of the College of
Pharmacy, Professor of Pharmacology, and Director of the University
Medicinal Plant Gardens
GUSTAV BACHMAN, Phm.D., Phm.M., Professor of Pharmacy
RICHARD OLDING BEARD, M.D., Associate Professor of Physiology
EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology
FREDERIC K. BUTTERS, Ph.D., Associate Professor of Botany
LOUIS J. COOKE, M.D., Assistant Director of Physical Education and Ath-
letics for Men
WILLIAM S. COOPER, Ph.D., Assistant Professor of Botany
ELIAS J. DURAND, D.Sc., Professor of Botany
LEO J. FARRELL, Captain Infantry, U.S.A., Assistant Professor of Military
Science and Tactics
WILLIAM K. FOSTER, B.A., LL.M., M.D., Assistant Professor of Physical
Education for Men.
CHARLES C. GAULT, M.A., M.D., Assistant Professor of Physiology
FRANK F. GROUT, Ph.D., Professor of Geology and Mineralogy
RODNEY B. HARVEY, Ph.B., Associate Professor of Plant Pathology and
Botany
ARTHUR T. HENRICI, M.D., Associate Professor of Bacteriology and
Immunology
NED L. HUFF, M.A., Assistant Professor of Botany
WILLIAM H. HUNTER, Ph.D., Professor of Chemistry
FRANCIS B. KINGSBURY, Ph.D., Associate Professor of Physiologic Chemistry
MAY S. KISSOCK, B.A., Assistant Professor of Physical Education for
Women
LEE I. KNIGHT, Ph.D., Professor of Botany
WINFORD P. LARSON, M.D., Professor of Bacteriology and Immunology
ORA M. LELAND, B.S., C.E., Professor of Chemistry
FRED W. LUEHRING, Ph.M., Director of Physical Education and Athletics
for Men
ELIAS P. LYON, Ph.D., M.D., Professor of Physiology
JESSE F. MCCLENDON, Ph.D., Professor of Physiology
THOMAS N. METCALF, M.A., Professor of Physical Education for Men
EDWIN L. NEWCOMB, Phm.D., Phm.M., Professor of Pharmaceutical Botany
and Pharmacognosy
J. ANNA NORRIS, M.D., Professor of Physical Education for Women
CHAUNCEY J. V. PETTIBONE, Ph.D., Associate Professor of Physiologic
Chemistry
LLOYD H. REYERSON, Ph.D., Assistant Professor of Chemistry

¹ Died April 3, 1922.

- CHARLES H. ROGERS, D.Sc. in Phm., Associate Professor of Pharmaceutical Chemistry and Pharmacy
- CARL O. ROSENDAHL, Ph.D., Professor of Botany
- HAL M. ROSE, Captain, U.S.A., Assistant Professor of Military Science and Tactics
- HENRY H. RUTHERFORD, B.A., Lieutenant Colonel Medical Corps, U.S.A., Assistant Professor of Military Science and Tactics
- FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Professor of Physiology
- EDWARD G. SHERBURNE, Major, U.S.A., Assistant Professor of Military Science and Tactics
- CHARLES F. SIDENER, B.S., Professor of Chemistry
- LEE I. SMITH, Ph.D., Assistant Professor of Chemistry
- M. CANNON SNEED, Ph.D., Associate Professor of Chemistry
- NEWTON W. SPEECE, Captain Infantry, U.S.A., Assistant Professor of Military Science and Tactics
- GIRARD STURTEVANT, Colonel, U.S.A.; Professor of Military Science and Tactics
- RUSSELL C. THROCKMORTON, Captain Infantry, U.S.A., Assistant Professor of Military Science and Tactics
- JOSEPHINE E. TILDEN, M.S., Professor of Botany
- ALICE J. H. TOLG, M.D., Assistant Professor of Physical Education for Women
- ANDREW C. TYCHSEN, Captain Infantry, U.S.A., Assistant Professor of Military Science and Tactics
- LAURENCE T. WALKER, Major, U.S.A., Assistant Professor of Military Science and Tactics
- JAMES E. WARE, Lieutenant Colonel, U.S.A., Retired, Assistant Professor of Military Science and Tactics
- LEE R. WATROUS, JR., Major, U.S.A., Assistant Professor of Military Science and Tactics
- JAMES D. WATSON, JR., Captain Signal Corps, U.S.A., Assistant Professor of Military Science and Tactics
- FREDERICK R. WUNDERLICH, D.D.S., Major Dental Corps, U.S.A., Assistant Professor of Military Science and Tactics
- CHARLES N. MCCLOUD, Phm.D., M.D., Lecturer on First Aid to the Injured
- GERTRUDE M. BAKER, Instructor in Physical Education for Women
- ANNE BENTON, M.A., Instructor in Bacteriology
- EARL J. BLONSCHIME, Private First Class, D.E.M.L., Instructor in Military Science and Tactics
- ALFRED BRANDT, Technical Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- EDWIN S. BROWN, M.D., Instructor in Physical Education for Men
- HARVEY W. BROWN, Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- HENRIETTA BROWNING, B.A., Instructor in Physical Education for Women
- HALLIE F. E. BRUCE, Phm.G., Instructor in Dispensing
- MARTIN B. CHITTICK, B.A., Phm.G., Instructor in Pharmacy

- HENRY DAHL, First Sergeant Retired, D.E.M.L., Instructor in Military Science and Tactics
- AUBREY R. DUNKUM, Staff Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- CHARLES L. FARABAUGH, B.S., Diplôme d'Etudes Supérieures, Instructor in Botany
- EARL B. FISCHER, B.S., Instructor in Pharmacognosy
- JOSEPH HAVLICEK, Regimental Commissary Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- PERCY C. GLIDDEN, Instructor in Physical Education for Men
- BERYL S. GREEN, B.A., Instructor in Bacteriology
- ROBERT G. GREEN, M.A., Instructor in Bacteriology
- CARL JENSEN, Regimental Supply Sergeant, U.S.A., Retired, Instructor in Military Science and Tactics
- ARTHUR M. JOHNSON, Ph.D., Instructor in Botany
- CLARENCE G. LANGE, Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- WALTER M. LAUER, M.S., Instructor in Chemistry
- EDMUND T. McCANN, Sergeant D.E.M.L., Instructor in Military Science and Tactics
- JOHN McWILLIAMS, First Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- CHARLES V. NETZ, Phm.C., B.S., Instructor in Pharmacy
- GRACE M. ROCKWOOD, B.A., Instructor in Physical Education for Women
- CARL B. ROEMER, Instructor in Physical Education for Men
- DAVID O. SPRIESTERSBACH, M.S., Instructor in Bacteriology and Immunology
- HARRY E. STRIDER, Technical Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- DÉL D. TURNER, Phm.C., Laboratory Instructor in Pharmacy
- JOE WIER, Sergeant, D.E.M.L., Instructor in Military Science and Tactics
- FRED WHITEMORE, Instructor in Physical Education for Men
- FRANK GILMAN, Assistant in Physical Education for Men
- HARRY GOLDIE, Assistant in Physical Education for Men
- CHARLES E. SHEPARD, B.S., Teaching Fellow in Physiology
- CHARLES E. SMYITHE, Assistant in Pharmacognosy and Departmental Librarian
- VIVIAN VOGEL, Phm.C., Assistant in Dispensing

GENERAL INFORMATION

The thirtieth annual course of the College of Pharmacy begins and ends as announced in the calendar on preceding pages.

ENTRANCE REQUIREMENTS

ADMISSION BY CERTIFICATE

Diplomas, certificates, or other evidences of the completion of an accredited four-year high school course, or of its educational equivalent, are required for admission. The high school course must have included:

- | | |
|---|---------|
| 1. English | 4 units |
| or English..... | 3 units |
| and a foreign language..... | 2 units |
| 2. Mathematics | |
| Elementary algebra..... | 1 unit |
| Plane geometry..... | 1 unit |
| 3. Latin | 1 unit |
| 4. Enough additional work to make in all 15 units, of which not more than 4 may be Group F. | |

Prospective students in pharmacy are urged to secure high school preparation in physics, chemistry, botany, and physiology.

Group F consists of high school, vocational, and miscellaneous subjects. Not more than 4 units and studies in this group may be counted toward admission. The subjects are no longer designated by the University. The applicant is free to present in this division such studies as are not listed in other groups, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

The freshman class is limited to sixty students.

ADMISSION BY EXAMINATION

Students may take examinations in subjects for which they have no certificates. A high school training covers a minimum of 15 units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations in respective high school subjects.

NEW STUDENTS

All applicants for admission should request their high school principals or superintendents to send a complete transcript of their records to the registrar of the University as early as possible and not later than August 1. Upon receipt of the credentials, the registrar will notify the applicant concerning his admission and will forward directions for registration. (See calendar for registration dates.)

New students are admitted only at the beginning of the fall quarter.

OLD STUDENTS

About September 1, the registrar will send a fee statement to your home address as it appears on the records of this office. Those who fail to receive this before September 7 should write to the registrar and ask for it. (See calendar for dates of registration and payment of fees.)

FEES AND OTHER EXPENSES

The quarterly tuition fee of \$30 for resident students and \$40 for non-resident students includes all laboratory fees, except chemistry and is payable at the beginning of each quarter. Certificates entitling the student to admission to classes will not be issued until fees have been paid.

Tuition fee (per quarter)

Residents of Minnesota.....	\$30.00
Non-residents	40.00
Deposit (first quarter only).....	10.00
Military deposit (required of all students taking military drill).....	10.00
Health fee (per quarter).....	2.00
Minnesota Union or Shevlin Hall (per quarter).....	1.00
Post-office box (per quarter).....	.20

Special fees:

Examination for removal of condition.....	1.00
Examinations for credits (after the first six weeks in residence).....	5.00
Special examinations.....	5.00
Chemistry deposit.....	5.00

PENALTY FEES:

Registration Penalties.—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

Those desiring to take special work may pay fees on a clock hour basis, the rate being \$1.25 an hour for resident students and \$1.75 an hour for non-resident students.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course for which they have matriculated.

Every person upon whom any degree is conferred must be of good moral character; must have completed the required three years of lecture and laboratory courses, the last at this college; and must have passed examinations in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Academically qualified persons desiring to do less than the work of the regular course may be admitted as unclassified or special students provided there is laboratory room for them. They will not be rated in their work or examined unless they make special request therefor. Work completed satisfactorily will be credited should the students subsequently enter the regular course, provided they meet the full entrance requirements. Registered pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

EXAMINATIONS AND STANDINGS

Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (conditions), I (incomplete), and F (failure). Conditions may be removed as indicated below. An *incomplete* not removed before the end of the first month of the student's next quarter in college becomes a *condition*. The Students' Work Committee may, in special cases, extend this time limit.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses, which must be taken in full.

Students having conditions in more than two major or in more than three minor subjects of the first year can not enter upon the second year's work. Candidates for graduation must have removed all conditions before entering upon the third quarter of the graduating year.

Examinations for the removal of conditions will be offered the week preceding the opening of the fall quarter. Similar examinations will also be given by certain of the colleges during the first thirty days of the winter and spring quarters. Announcement of these examinations will appear in the general information bulletin and the *Official Daily Bulletin*. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absences will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this college, subject to the approval of the dean. Opportunity is afforded to do advanced work in all branches. Textbooks may be obtained after coming to the University.

Students find their time fully occupied.

MEDICINAL PLANT LABORATORY AND GARDEN

Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the educational facilities of the college. The college has no experience or information concerning the commercial cultivation of medicinal plants.

DISPENSARY PRESCRIPTION PRACTICE

The seniors, under competent direction and supervision, dispense the prescriptions written by the physicians in the Out-Patient Department of the University Hospitals. During the past year upwards of twenty-five thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

ELECTIVES IN OTHER UNIVERSITY COLLEGES

Students may elect certain subjects in other university colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the dean.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In many states, including Minnesota, such training is now obligatory by law. In a number of other states credit is given for college work. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug store experience before they become eligible for examination for full registration.

SCHOLARSHIPS

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP

The Minnesota State Pharmaceutical Association awards annually \$90 in cash and a token to that student who is a citizen of the United States, who has resided in Minnesota for at least five years, and who has earned the highest general rating in both the first and second years of the regular course in this college up to ten days before Cap and Gown Day. If such student should discontinue attendance at the college, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

THE FAIRCHILD SCHOLARSHIP

Mr. Samuel W. Fairchild offers a scholarship in the sum of \$300 to be awarded to that student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who has had two years of drug store experience, is a high school graduate, who has completed one year in a recognized college of pharmacy, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy. Fuller particulars may be had from the dean of the college.

POSITIONS FOR GRADUATES

The demand for graduates of this college has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This college is recognized in all states, including those in which state standards of efficiency have been established.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the college four times each year to examine candidates for registration. For information concerning the board or state examinations, address the secretary of the board, Mr. H. Martin Johnson, Fourth and St. Peter Streets, St. Paul, Minnesota.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

This college is a member of the American Conference of Pharmaceutical Faculties, whose object is the promotion of higher pharmaceutical education. Through the influence of the conference, higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the conference. Member colleges must maintain certain minimum entrance and graduation requirements. This college exceeds these requirements.

THE NORTHWESTERN BRANCH OF THE AMERICAN
PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

COMMUNICATIONS

Address communications not relating to registration to the dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota.

For further information see general information bulletin.

COURSE OF STUDY

Four graded courses leading respectively to the degrees pharmaceutical chemist, bachelor of science in pharmacy, master of science in pharmacy, and doctor of science in pharmacy, are authorized by the regents. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded, and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six years.

THE PRESENT REGULAR COURSE

This course extends over a period of three full University years. The lengthening of the regular course from two to three years has been approved by the Minnesota State Pharmaceutical Association and by the Minnesota State Board of Pharmacy. The curriculum of this course is described in the following pages, but its division among the three years may be changed as experience may warrant.

OUTLINE OF THE REGULAR THREE-YEAR COURSE

(Subject to change)

FRESHMAN

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Botany	Botany	Botany
General Chemistry	General Chemistry	General Chemistry
Military training	Military training	Military training
Pharmacy	Pharmacy	Pharmacy
Pharmac. Chemistry,	Pharmac. Chemistry,	Pharmac. Chemistry,
Didactic	Didactic	Didactic
Pharmacognosy	Pharmacognosy	Pharmacognosy

JUNIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Materia Medica	Materia Medica	Materia Medica
Qualitative Chemistry	Organic Chemistry	Organic Chemistry
Pharmacognosy	Pharmacognosy	Pharmacognosy
Pharmac. Chemistry,	Pharmac. Chemistry,	U. S. P. Testing
Practical	Practical	Therapeutics
Military training	U. S. P. Testing	Operative Pharmacy
	Military training	Military training

SENIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Dispensing	Dispensing	Dispensing
U. S. P. Assay	U. S. P. Assay	U. S. P. Assay
Bacteriology	Drug and Food Analysis	Mineralogy and Crystallog.
Drug and Food Analysis	Physiology	Drug and Food Analysis
Dispensary Practice	Dispensary Practice	Law and Ethics
Organic Pharmacy		Dispensary Practice

THE FOUR-YEAR COURSE

The four-year course includes all of the regular three-year course and in addition rhetoric, 9 credits; any modern language, 9 credits; physics, 9 credits; and electives sufficient to total at least 18 additional credits. Students who have completed this academic or pre-pharmacy work in the College of Science, Literature, and the Arts, or in a college of corresponding standing, are eligible for entrance upon the second year of this course.

CREDIT VALUE

The credit values of courses were changed September, 1918. Now a credit value covers one period of lecture or recitation or two periods of laboratory work per week per quarter. The numbers expressing the credit value of courses are now fifty per cent greater than formerly.

DEPARTMENTAL STATEMENTS

BACTERIOLOGY AND IMMUNOLOGY

Professor WINFORD P. LARSON; Associate Professor ARTHUR T. HENRICI;
Instructors ANNE BENTON, BERYL S. GREEN, ROBERT G. GREEN, DAVID
O. SPIESTERSBACH.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f,w,s,su	Elementary Bacteriology.....	5	Sr.	None

For additional courses see the bulletin of the Medical School.

1f,w,s,su. ELEMENTARY BACTERIOLOGY. Lecture and laboratory course. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. DR. LARSON, MISS BENTON, MR. GREEN.

BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule one two-hour period a week for this kind of work during the second quarter of the graduating year. A room has been reserved for this purpose in the Pharmacy Building. To make this work of the utmost value the pharmaceutical library is being enlarged.

BOTANY

Professors C. OTTO ROSENDAHL, ELIAS J. DURAND, LEE I. KNIGHT, JOSEPHINE E. TILDEN; Associate Professor FREDERIC K. BUTTERS, RODNEY B. HARVEY, Assistant Professors WILLIAM S. COOPER, NED L. HUFF; Instructors CHARLES L. FARABAUGH, ARTHUR M. JOHNSON.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
17f-18w-19s	General Botany.....Total	9	Fr.	None

17f-18w-19s. GENERAL BOTANY AND GREENHOUSE WORK. Study of external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outline of classification of flowering plants. Lectures, laboratory work, field work. MR. BUTTERS.

CHEMISTRY

Professor WILLIAM H. HUNTER; Associate Professor M. CANNON SNEED; Assistant Professors LLOYD H. REYERSON, LEE I. SMITH; Instructor WALTER M. LAUER.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f,2w,3s	Gen. Inorganic Chemistry....	4	Fr.	Non-
11f	Qualitative Analysis.....	4	Soph.	1, 2, 3
31w-32s	Elementary Org. Chemistry..	4	Soph.	1, 2, 3

1f. GENERAL INORGANIC CHEMISTRY. A study of the general laws of chemistry and of the non-metals and their compounds. MR. REYERSON.

2w. GENERAL INORGANIC CHEMISTRY. A continuation of Course 1. MR. REYERSON.

3s. GENERAL INORGANIC CHEMISTRY. A study of the metals and their compounds. A continuation of Course 2. MR. REYERSON.

11f. QUALITATIVE CHEMICAL ANALYSIS. Laboratory work in systematic qualitative analysis with lectures on solution, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. For students who satisfy the requirements of general chemistry. MR. REYERSON.

31w-32s. ELEMENTARY ORGANIC CHEMISTRY. A discussion of the important classes of organic compounds, both aliphatic and aromatic. The laboratory work includes the preparation of typical substances. Primarily for dentistry and pharmacy students. MR. LAUER.

CLINICAL MICROSCOPY

Professor.....; Instructor.....

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Clinical Chemistry and Microscopy .....Total	1	Sr.	None

1s. CLINICAL CHEMISTRY AND MICROSCOPY. Includes (a) the microscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc. Optional.

DISPENSARY PRESCRIPTION PRACTICE

Instructor HALLIE BRUCE; Assistant VIVIAN VOGEL.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f,w,s	Prescription Practice.....Total	2½	Sr.	Pharm. 5

1f,w,s. DISPENSARY PRESCRIPTION PRACTICE. The prescription dispensing for the Out-Patient Department of the University Hospitals is in charge of the College of Pharmacy. The senior students do the prescription work under competent direction. MISS BRUCE, MISS VOGEL.

FIRST AID TO THE INJURED

Lecturer CHARLES N. McCloud and assistant.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Emergency Cases.....Total	1	Sr.	None

15. **EMERGENCY CASES.** A series of lectures and demonstrations designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician. DR. McCLOUD.

MATERIA MEDICA

Professors EDWIN L. NEWCOMB, FREDERICK J. WULLING; Instructor EARL B. FISCHER and assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f,w,s	Inorganic Materia Medica.....	1	Fr.	None
2f,w,s	Organic Materia Medica.....	6	Fr.,jr.	None

1f,w,s. **INORGANIC MATERIA MEDICA.** This course runs concurrently and in close relationship with Pharmacy 8 and 11, and includes chiefly the medical properties and doses of inorganic official bodies. MR. WULLING and assistants.

2f,w,s. **ORGANIC MATERIA MEDICA.** The identity, sources, botanical origins, families, constituents, preparations and doses of the U. S. P., and of some unofficial vegetable drugs are studied in this course. MR. NEWCOMB, MR. FISCHER, and assistants.

MILITARY SCIENCE AND TACTICS

Professor GIRARD STURTEVANT, Colonel, Infantry; Assistant Professors JAMES E. WARE, Lieutenant Colonel, Retired; HENRY H. RUTHERFORD, Lieutenant Colonel, Medical Corps; LAURENCE T. WALKER, Major, Coast Artillery Corps; LEE R. WATROUS, Jr., Major, Coast Artillery Corps; FREDERICK R. WUNDERLICH, Major, Dental Corps; EDWARD G. SHERBURNE, Major, Infantry; JAMES E. WATSON, Captain, Signal Corps; NEWTON W. SPEECE, Captain, Infantry; ANDREW C. TYCHSEN, Captain, Infantry; RUSSELL C. THROCKMORTON, Captain, Infantry; LEO J. FARRELL, Captain, Infantry; HAL M. ROSE, Captain, Cavalry; Instructors JOSEPH HAVLICEK, Regimental Commissary Sergeant, Retired; CARL JENSEN, Regimental Supply Sergeant, Retired; JOHN MCWILLIAMS, 1st Sergeant, Retired; HENRY DAHL, 1st Sergeant, Retired; HARRY E. STRIDER, Technical Sergeant, Signal Corps; ALFRED BRANDT, Technical Sergeant, Infantry; AUBREY DUNKUM, Staff Sergeant, Coast Artillery Corps; CLARENCE E. LANGE, Sergeant, Field Artillery; JOE WEIR, Sergeant, Infantry; EDMUND T. McCANN, Sergeant, Infantry; HENRY W. BROWN, Sergeant, Coast Artillery Corps; EARL J. BLONSHINE, Private, 1st Class, Coast Artillery Corps.

COURSES

1-2-3. **FIRST-YEAR BASIC COURSE R.O.T.C. INFANTRY.** Practical and theoretical instruction in school of soldier squad and company; elementary subjects of military training; infantry weapons and equipment.

4-5-6. **SECOND-YEAR BASIC COURSE R.O.T.C. INFANTRY.** Practical instruction in school of platoon and company; military sketching and map-reading; infantry weapons including machine gun and automatic rifle; minor tactics.

51-52-53. FIRST-YEAR ADVANCED COURSE R.O.T.C. INFANTRY. Field engineering; infantry weapons, including trench mortars, 37 mm. gun, grenades, and pistol; minor tactics.

54-55-56. SECOND-YEAR ADVANCED COURSE R.O.T.C. Infantry. Minor tactics; administration; military law; musketry: military history and policy of the United States; rules of land warfare.

PHARMACY

Professors FREDERICK J. WULLING, GUSTAV BACHMAN; Associate Professor CHARLES H. ROGERS; Instructors HALLIE BRUCE, MARTIN B. CHITTICK, DEL D. TURNER, CHARLES V. NETZ; and student assistants

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f	History of Pharmacy.....	¾	Fr., jr.	None
3f	Metrology	4½	Fr., jr.	None
5w	Physics of Pharmacy.....	4½	Fr., jr.	3f
7w,s	Pharmaceutical Processes....	5	Fr., jr.	5w
2w,s	Pharmacopoeial Preparations..	7½	Fr., jr.	7s
4f,w,s	Pharmacy Quiz	4½	Fr., jr.	3f,5w,7s,2s
6w,s	Identification Inorganic U. S. P. Preparations	2	Fr., jr.	2s
9f	Pharmaceutical Chemical Philosophy	3	Fr., jr.	None
11w	Pharmaceutical Chemistry of the Non-Metals	3	Fr., jr.	9f
8s	U. S. P. Inorganic Salts.....	3	Fr., jr.	9f
13f	Classification of Pharmaceutical Organic Compounds	1½	Jr., sr.	8s
15f,w,s	Pharmaceutical Organic Compounds and Their Preparations	9	Jr., sr.	13f
17f	Pharmacopoeial Qualitative Anal.	7½	Jr., sr.	11w
18w	Pharmacopoeial Quant. Anal...	3	Jr., sr.	17f
19f,w,s	Prescription Incompatibility...	2	Jr., sr.	None
21f,w,s	Prescription Dispensing.....	18	Jr., sr.	None
8a f,w	Manufacture Pharmaceutical Inorganic Salts.....	6	Jr., sr.	8s
10w	National Formulary.....	1½	Jr., sr.	15,8a,w
12w	Pharmaceutical Assay.....	2	Jr., sr.	10w
14s	Synthetic Remedies.....	1	Jr., sr.	15
16w	Homeopathic Pharmacy.....	1	Jr., sr.	21
25w,s	Identification U. S. P. Organic Salts	2	Jr.,sr.	8s,15w
20s	Microchemistry .....	..	.....	.....
27	Mathematics of Pharmacy...	1	Fr., jr.	3f
29f,w,s	Drug and Food Analysis.....	24	Sr.	.....
51f,w	Metrology, Elementary.....	1	Fr.,jr.	None

1f. HISTORY OF PHARMACY. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. MR. WULLING, MR. ROGERS.

3f. METROLOGY. A critical study of weights and measures and balances; specific gravity, specific volume; alligation, etc. MR. ROGERS, MR. NETZ.

- 5w. THE PHYSICS OF PHARMACY. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. MR. ROGERS, MR. NETZ.
- 7w,s. PHARMACEUTICAL PROCESSES. A study of the various laboratory processes employed in pharmaceutical manufacture. MR. ROGERS, MR. NETZ.
- 2w,s. PHARMACOPOEIAL PREPARATIONS. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulae and processes. MR. ROGERS, MR. NETZ, and assistant.
- 4f,w,s. PHARMACY QUIZ. A thoro review of the work covered in Courses 3f, 5w, 7s, and 2s. MR. ROGERS.
- 6w,s. IDENTIFICATION OF INORGANIC U. S. P. PREPARATIONS. The study of the appearance and physical properties of inorganic official preparations. MR. ROGERS, MR. NETZ.
- 9f. PHARMACEUTICAL CHEMICAL PHILOSOPHY. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. MR. WULLING.
- 11w. THE PHARMACEUTICAL CHEMISTRY OF THE NON-METALS. A study of the description, properties, pharmacy, and manufacture of the non-metals used in pharmacy, including their U. S. P. preparations. MR. WULLING.
- 8s. U. S. P. INORGANIC SALTS. Especial reference to sources, description, properties, and manufacture. MR. WULLING.
- 8af,w. MANUFACTURE OF PHARMACEUTICAL INORGANIC SALTS. The preparation of upwards of forty pharmaceutical salts included in this course. MR. ROGERS, MR. NETZ, and assistant.
- 13f. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS. A preparation for Pharmacy 15. MR. WULLING, MR. ROGERS.
- 15f,w,s. PHARMACEUTICAL ORGANIC COMPOUNDS AND THEIR PREPARATIONS. Includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc. MR. ROGERS.
- 17f. PHARMACOPOEIAL QUALITATIVE ANALYSIS. A critical study of the identity, purity, limit, and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. MR. BACHMAN, MR. CHITTICK, MR. TURNER.
- 18w. PHARMACOPOEIAL QUANTITATIVE ANALYSIS. This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not Pharmaceutical Assay (12w). MR. BACHMAN, MR. CHITTICK, MR. TURNER.

- 19f,w,s. **PRESCRIPTION INCOMPATIBILITY.** Therapeutic, pharmaceutical, and chemical incompatibility is taken up in lecture and recitation work preliminary to Course 21. MR. BACHMAN, MR. CHITTICK.
- 21f,w,s. **PRESCRIPTION DISPENSING.** This course runs concurrently and in coöperation with Dispensary Prescription Practice 1f,w,s, and includes the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. MR. BACHMAN, MISS BRUCE, MR. TURNER.
- 10w. **NATIONAL FORMULARY.** This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. MR. BACHMAN, MR. CHITTICK, MR. TURNER.
- 12w. **PHARMACEUTICAL ASSAY.** The quantitative determination of alkaloidal and other active constituents of a number of the potent U. S. P. organic drugs and preparations. MR. BACHMAN, MR. CHITTICK, MR. TURNER.
- 14s. **SYNTHETIC REMEDIES.** The study of the pharmaceutical chemistry of synthetic chemicals in medical use. MR. ROGERS.
- 16w. **HOMEOPATHIC PHARMACY.** A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. MR. WULLING, MR. BACHMAN.
- 25w,s. **IDENTIFICATION OF U. S. P. SALTS.** The study of the physical identity of the more important official inorganic and organic salts. MR. BACHMAN, MR. CHITTICK, MR. TURNER.
- 20s. **MICROCHEMISTRY.** Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. MR. NEWCOMB, MR. ROGERS.
27. **MATHEMATICS OF PHARMACY.** While students are required to have a preparation in arithmetic, algebra, and geometry before entering, they receive frequent drills throughout the year. Examinations in the subject are required. MR. WULLING, MR. BACHMAN, MR. ROGERS, MISS BRUCE, MR. CHITTICK.
- 29f,w,s. **DRUG AND FOOD ANALYSIS.** A course designed to prepare students for commercial pharmaceutical analytical work. MR. ROGERS, MR. NETZ, and assistant.
- 51f,w. **METROLOGY, ELEMENTARY.** For Nurses. MR. WULLING, MR. ROGERS.

PHARMACEUTICAL AND BUSINESS LAW

Professor FREDERICK J. WULLING.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Ethics and Law for Pharmacists....	2	Sr.	None
2s	Minnesota Pharmacy Laws.....	1/3	Sr.	None

- 1s. LAW FOR PHARMACISTS. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy, and discuss the liability of retail pharmacists. MR. WULLING.
- 2s. MINNESOTA PHARMACY LAWS. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Professor FRANK F. GROUT and assistant.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Mineralogy	1	Sr., grad.	None
2s	Crystallography	1	Sr., grad.	1s

- 1s. MINERALOGY. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relation. MR. GROUT and assistant.
- 2s. CRYSTALLOGRAPHY. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. MR. GROUT.

PHARMACOGNOSY

Professor EDWIN L. NEWCOMB; Instructor EARL B. FISCHER; Assistant CHARLES E. SMYTHE and student assistants.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1s	Medical Plant Study.....	1	Fr.	None
2w	The Thallophytes and Archegoniates	2	Fr.	1
3s	Pharmaco-Histology	3	Fr.	2w, Mat. Med. 1f, w, s
4f	Drug Collection	3	Jr.	3s
5w	The Angiosperms	10	Jr.	3s-Botany 17f, 18w
6s	Field Work	2	Jr.	1s
7w	Physiological Drug Assay	3	Sr.	5w
8w, s	Advanced Pharmacognosy	3	Sr.	5w

- 1s. MEDICINAL PLANT STUDY AND DRUG PREPARATIONS. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. MR. NEWCOMB, MR. FISCHER, and assistants.
- 2w. THE PHARMACOGNOSY OF THE THALLOPHYTES AND ARCHEGONIATES. In this course some of the drugs and economic products obtained from

the thallophytes and archegoniates are studied. MR. NEWCOMB, MR. FISCHER, and assistants.

- 3s. PHARMACO-HISTOLOGY. Includes the micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by official and unofficial drugs. MR. NEWCOMB, MR. FISCHER, and assistants.
- 4f. DRUG COLLECTION AND PREPARATION. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. MR. NEWCOMB, MR. FISCHER, and assistants.
- 5w. PHARMACOGNOSY OF THE ANGIOSPERMS. Includes the scientific study of the official whole and powdered seeds, roots, rhizomes, barks, woods, pith, flowers, fruits, leaves, herbs, exudations, animal drugs, etc., and their adulteration. MR. NEWCOMB, MR. FISCHER, and assistants.
- 6s. FIELD WORK. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. MR. NEWCOMB.
- 7w. PHYSIOLOGICAL DRUG ASSAY. Optional. The pharmacopoeial and the more important unofficial methods of biologic assay of drugs and their preparations are studied. Four-year course only. MR. NEWCOMB.
- 8w,s. ADVANCED PHARMACOGNOSY. Designed to give students a working knowledge of the use of the more important microscopical accessories in advanced pharmacognostic work. Four-year course only. MR. NEWCOMB.

PHYSICAL EDUCATION

FOR MEN

Professors FRED W. LUEHRING, Director; THOMAS N. METCALF; Associate Professor LOUIS J. COOKE, Assistant Director; Assistant Professor WILLIAM K. FOSTER; Instructors EDWIN S. BROWN, PERCY C. GLIDDEN, CARL B. ROEMER, FRED WHITTEMORE; Assistants FRANK GILMAN, HARRY GOLDIE.

The purpose of the department is to provide all men of the University opportunities for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1f	Personal Hygiene.....	None	All	None
1f.	PERSONAL HYGIENE. Two hours per week; first six weeks of first quarter. Examination at close of course. DR. COOKE, DR. BROWN, MR. FOSTER.			

A special lecture on sex hygiene is given sometime during the first ten days of the autumn quarter, with required attendance on the part of all freshmen.

PHYSICAL EDUCATION

FOR WOMEN

Professor J. ANNA NORRIS; Assistant Professors MAY S. KISSOCK, ALICE H. TOLG; Instructors GERTRUDE M. BAKER, HENRIETTA BROWNING, GRACE M. ROCKWOOD.

This department aims to promote the health of the women students. It gives physical examinations and advice to all on entrance; plans systematically to keep in close touch with them during their first year in college; conducts yearly consultations with, and examines when necessary, all upper-class students; gives courses in hygiene; organizes physical work to meet the varying needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department is required of all newly entering students (see Courses 1-2-3, 4, 22), of sophomores who can not pass the swimming examination, and of all students permitted, for reasons connected with their physical condition, to carry less than the minimum number of credit hours. Physical examinations or consultations required annually of all students.

Elective classes arranged in gymnastics, dancing, swimming, field-hockey, basket-ball, baseball, and other activities.

For requirements for a teacher's certificate, see bulletin of the College of Education.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1f-2w-3s	Elementary Physical Training..	None	Required of all new students	None
4f	Preliminary Hygiene.....	None	All new students	None
22f	Beginning Swimming	None	Soph.	1-2-3

1f-2w-3s. ELEMENTARY PHYSICAL TRAINING. Lighter forms of gymnastics; gymnastic dances; indoor and outdoor games. Study of daily habits of living. Shower bath fee, \$2.50 per quarter. Miss KISSOCK, DR. TOLG, MISS BROWNING, MISS ROCKWOOD.

4f. PRELIMINARY HYGIENE. One lecture a week. The most essential aspects of the care of the body. DR. NORRIS.

22f. SOPHOMORE ELEMENTARY SWIMMING. For beginners. Shower bath fee, \$2 per quarter.

PHYSIOLOGY

Professors ELIAS P. LYON, FREDERICK H. SCOTT, JESSE F. McCLENDON; Associate Professors RICHARD OLDING BEARD, FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE; Assistant Professor CHARLES C. GAULT; Teaching Fellow CHARLES E. SHEPARD.

3f,w,su. HUMAN PHYSIOLOGY. Science, Literature, and the Arts, School of Nursing, Home Economics, and other students. Prerequisites: elementary biology and chemistry. Lectures and laboratory. 5 qtr. cr. DR. LYON, DR. BEARD, MR. SHEPARD.

4f,w,su. Same as Course 3 without laboratory. Pharmacy students.

6s,su. PHYSIOLOGIC CHEMISTRY. Dental students and others. Prerequisite: organic chemistry. 3 qtr. cr. DR. McCLENDON, DR. KINGSBURY, DR. PETTIBONE.

THERAPEUTICS AND TOXICOLOGY

Associate Professor EDGAR D. BROWN.

COURSE

No.	Title	Credits	Offered to	Prerequisite courses
1s	Therapeutics and Toxicology.....	3	Jr.	Pharmacognosy 5w, Mat. Med. 1f,w,su

1s. THERAPEUTICS AND TOXICOLOGY. Drugs are studied in groups as governed by their medicinal and toxic properties. Remedial measures other than those depending upon drugs are fully considered. Poisonous action and doses of drugs also receive consideration. DR. BROWN.